JOURNAL OF ELECTRICITY

POWER AND GAS

Devoted to the Conversion, Transmission and Distribution of Energy

Entered as second-class matter May 7, 1906, at the Post Office at San Francisco, Cal., under the Act of Congress March 3, 1879

VOL. XXIII NO. 6 | SAN FRANCISCO, AUGUST 7, 1909 | PER COPY, 10 CENTS

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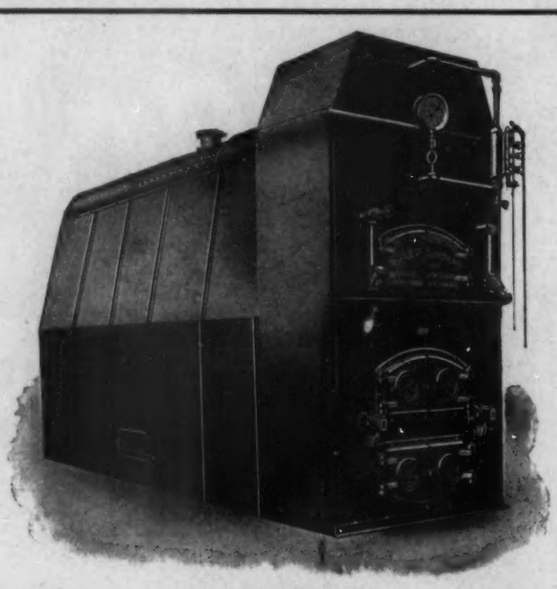

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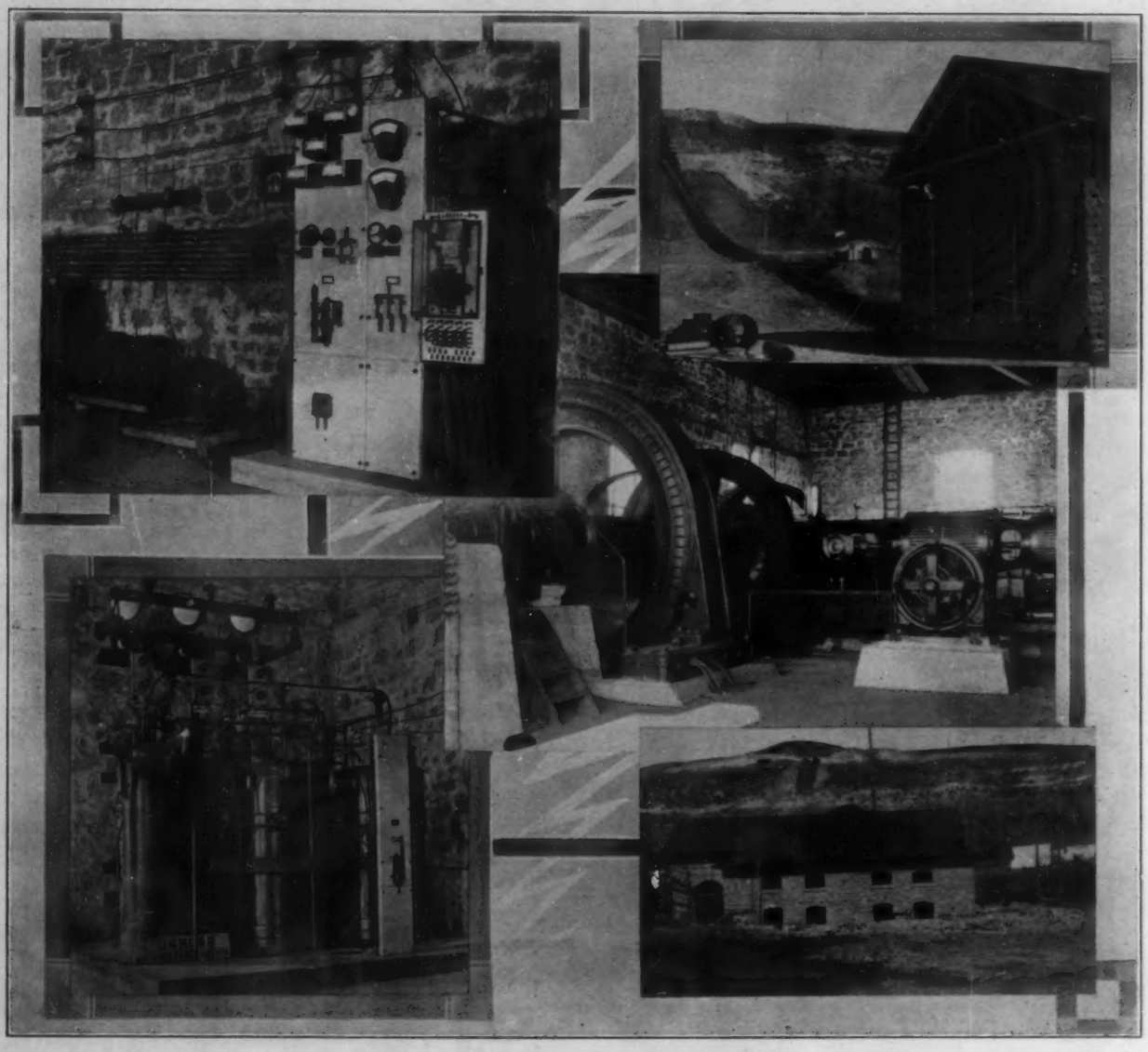
ELECTRICITY IN THE YAKIMA VALLEY.



Yakima Valley Power Company's Plant at Naches.

The United States Government plans to spend nearly eight million dollars in irrigating 250,000 acres of what was once called desert land in the Yakima valley in the south central part of the State of Washington. The largest of these projects is the Sunnyside, which covers 99,000 acres, at an estimated cost of $2,253,000; the Tieton project embraces 30,000 acres of irrigable land, and will cost $1,800,000, and the Wapato will eventually reclaim 120,000 acres, at a cost of $3,600,000. Through private enterprise a small part of this great acreage has already been irrigated and is now covered with orchards yielding an annual profit of $500 per acre and in anticipation of like results, many settlers are buying land. Prosperous

towns have sprung up along the Yakima river and the line of the Northern Pacific Railroad, the largest being North Yakima; Prosser, Kennewick and Pasco also rapidly growing. All of these and intervening towns are connected with the transmission lines of the Yakima Valley Power Company, which will be supplying nearly 7000 k. w. by the end of 1909 from its several steam and hydro-electric power plants.

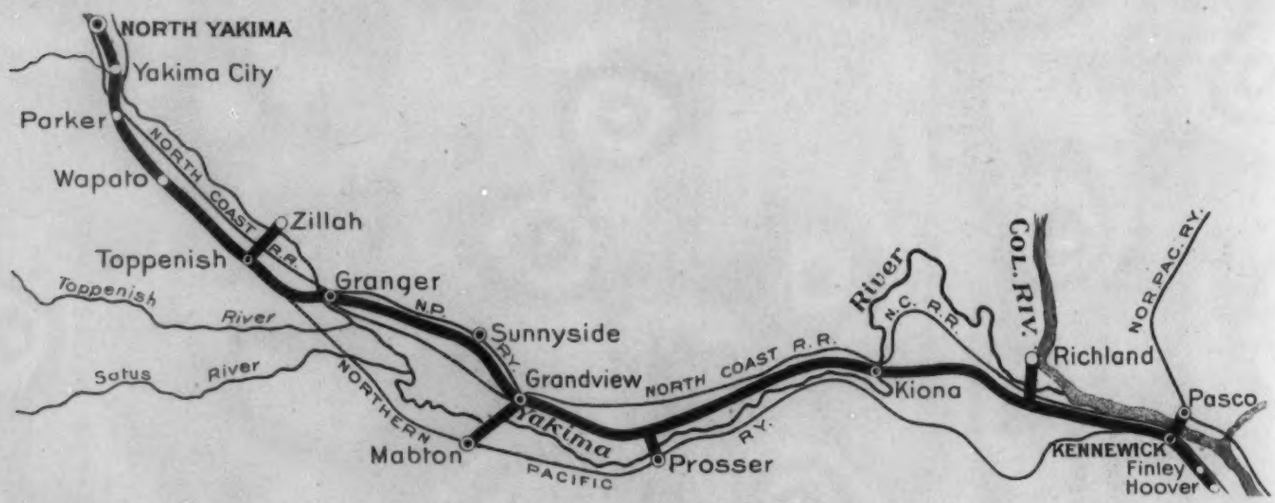
The main power plant, views of which are shown in the accompanying group picture, is on the Naches river, thirteen miles above the junction with the Yakima river at North Yakima. This plant contains a 750 k. w. General Electric alternator driven at 150 r. p. m. by a Pelton water wheel under a head of 149 feet. The wheel is novel in that the nozzles are steam-jacketed, but as the water in the ditch generally freezes before reaching the nozzle in winter, this innovation has not been thoroughly tried out. Because of this freezing in the winter a steam-driven generating unit is held in reserve. There is now being installed two new units; one water-driven, the other steam-driven. The former is a 3000 k. w. 2300 volt, type A. T. B. 14-pole General Electric three-phase alternator, driven by a Platt Iron Works' wheel. The other is a turbo-generator set rated at 2500 k. v. a., consisting of a type A. T. B. 4-pole generator and a Curtis steam turbine, operating at 160 pounds pressure. This, together with exciter sets and switchboard panels, will probably be completed by December 1 of this year. The present head of 149 feet is to be raised to 208 feet by a new pipe line delivering 450 sec. ft.

The old power house in North Yakima contains a 500 k. w. water-driven and a like steam-driven unit. At Kennewick there is a 500 k. w. Curtis steam turbine with type A. T. B. 4-pole 2300-volt generator. As may be seen from the accompanying map of the transmission line, it reaches from the power plant, thirteen miles above North Yakima, to Pasco, giving a total length of 102 miles, 300 feet spans and No. 3 aluminum strand wire being used. The present trolley voltage of 25,000 is to be raised to 66,000 volts, three-phase.

In addtion to supplying light in these towns, considerable power will be used for irrigating the lands, thus making lands above the level of the canals available for cultivation. It is noteworthy that a large number of electric irons have been introduced through the progressive policy of the company. On the circuit are 190 arc lights and 15,000 incandescent lamps, many tungstens having recently been installed. The Yakima Valley Power Company furnishes current to the Yakima Valley Transportation Company, which have three miles of standard gauge railway in North Yakima, with plans for an extensive system embracing the entire valley.

The president of the Yakima Valley Power Company is Robert E. Strahorn of Spokane; the local manager and purchasing agent, George Arrowsmith of North Yakima, and the chief engineer, H. Mills, at the plant. This company is a subsidiary concern of the Northwest Light and Power Company.

The Prosser Falls Land and Power Company at Prosser are also operating two hydro-electric plants near Prosser and are preparing to put in another one to develop 1000 horsepower, three miles from the town. Mr. E. F. Benson is president and manager, John Chisholm superintendent and G. D. Longmuir electrician.



Transmission Lines of Yakima Valley Power Co.

Coal in Washington produced during 1908 as reported to the United States Geological Survey totalled 3,016,557 short tons, having a spot value of $6,673,091. The record made by the coal mining industry of Washington in 1908 was in pronounced contrast to that of the preceding year. In 1907, notwithstanding the increased production of fuel oil in California, the principal market for Washington coals, the production increased 404,348 short tons over that of 1906, the mines of the State sharing in the general prosperity that marked the first nine months of 1907. It was estimated, however, that in November and December, 1907, the output at the mines was curtailed about 33 per cent as compared with the earlier months of the year. The statistics for 1908 show that the unsatisfactory conditions which prevailed in November and December, 1907, continued throughout 1908.

SOME UNDEVELOPED USES OF ACCOUNTS.

In any comparison of uniform data it is not difficult to locate the weakest or the strongest in any one respect. But it is difficult to collect and correctly interpret statistics which will show how weak or how strong a company may be, taking into account the relative importance of all the various data bearing on the subject. It is easy to show by statistics that a certain matter should be corrected but it is painstaking work to prove that it can be corrected without unfavorable reactions on anything else.

In the development of comparative telephone statistics three essentials stand out, viz.: the development of units, the determination of standards and the correlation of data, and these essentials apply not only to company data but also to statistics of departmental and individual efficiency.

When the gross amounts to be compared vary considerably as they frequently do, and when comparisons of percentages are not sufficient for the purpose, it is necessary to reduce the data to some common denominator. The most intelligible way of doing this is by the use of some unit such as the station, or the message, or the mile of wire. I do not believe any one unit will serve all purposes in considering telephone statistics. Nor has anyone yet gone far enough to say authoritatively what units are most appropriate for all the different classes of such data.

Charles G. Du Bois.

The simplest unit, by which to measure investment, revenue and expense, and the unit generally used, is the subscribers' station. Under the conditions that first existed, when each subscriber had one set of instruments and was connected with the central office exchange by one circuit, this was a fair unit; but conditions have changed. Each subscriber does not have one station; some have an extension; some are party lines;—two, four and more on a circuit; some are grouped in private branch exchanges and trunked over one or more circuits; some have separate answering jacks at the central office for each station, some have one answering jack for several stations.

All these different conditions have their effect. This is at once apparent with respect to the revenue, for different rates are made for private branch exchanges, and for party lines, and for extensions, as distinguished from the simple and original form of individual service. The value of a station, as a unit for universal use, is accordingly impaired. It is still a fairly safe average for certain uses because simple conditions still exist in many cases, but it must not be too confidently relied upon.

The average per station for repairs of aerial lines may be low in one company and high in another, but the low company may have many private branch exchanges and party lines. Probably a better method would be to compare the percentages of repairs on aerial lines to the cost of the aerial lines in various companies, or to compare the repairs per mile of aerial wires.

But the mile of wire is clearly not a fair unit for all purposes, as for instance operating wages, which depend chiefly on the number of calls, though even here we have to consider the effect of irregular calls. Various schemes of so-called weighted units are proposed, meaning thereby different relative values for different classes of transactions when the total expenditure for all cannot be subdivided. The fairness of the weighted unit depends directly on the accuracy with which these different relative values are calculated, and unfortunately from the nature of the case, they are usually more or less arbitrary.

These few comments will perhaps indicate the possibilities and opportunities before us for the development of fair units.

Having established and defined the unit for any particular class of data we have then to say what figure is the standard on one side of which a result is satisfactory and on the other side of which a result is unsatisfactory. To illustrate—suppose we conclude that the mile of wire is the most suitable unit for comparing the cost of repairs to toll lines, one with another. Suppose we find that the actual figures on this vary from $1.00 per mile per year to $3.00 per mile per year, but that we find a number of cases, not known to have exceptional conditions, are around $1.30. The practical way to make use of this data is to let everyone responsible for the repair of toll lines to know that there is a standard $1.30 which (with all reasonable allowances for exceptional cases) he is not expected to exceed, while bettering it will be to his credit.

Can anyone doubt the practical good that would result from the use of only this one statistical standard? Nor is this a theoretical measure. It is the basis of modern scientific piece work. It is the principle followed in many of our own companies as to operating loads. It is equally, though perhaps not so easily,

Abstract of paper read before the New York Telephone Society by Charles G. Du Bois, Comptroller American Tel. and Tel., Boston, Mass.

applicable to other operating and maintenance work, to construction, and to routine clerical work.

The third essential toward getting the full use of telephone statistics is the correlation of different kinds of data. This affords an unlimited opportunity for the exercise of ingenuity, enterprise and sound reasoning. Here we pass out of the field of simple arithmetical comparisons and have to consider what data has a bearing on the telephone business and of this what we will select as likely to throw light on any particular phase of the business. It is evident that if we start at random we shall soon be lost in a maze of figures. We must then fix our minds on some particular purpose, some specific question and gather around that whatever seems to bear on it. Then we must study and judge the bearing of each part of this data on every other part. This is not peculiarly the work of an accountant or statistician. It is exactly what every clear-headed administrator who bases his actions on knowledge and reason tries to do. This is perhaps worth an illustration. From one source of information the administrator knows the rate of net increase in stations for a certain period and from other statements he learns the rate at which net investment in plant is increasing. His first thought then might be that if plant investment has in any period increased less rapidly than stations the general situation justifies certain recommendations for extensions. But on reflection some other questions arise as to that general situation.

Suppose the net increase in stations was 3 per cent for a certain period and the increase in plant investment was 2 per cent. Before the administrator can be satisfied that this is as good a showing as it appears to be he should know—

1. That the stations added were of average revenue producing character or better.
2. That the increased plant investment was of such a character that it will not unduly increase maintenance.
3. That the expense of canvassing for those new stations was not such as to absorb the net earnings from them for an unreasonable period.

All this and perhaps much else is only to satisfy the administrator that his business is set upon safe lines, that he is not fooling himself by a few statistics not properly correlated with other and, of course, in making his decisions as to specific extension he must have all the significant facts pertaining to each.

A scheme of accounts is only a method for getting data as to financial transactions. From the early days of business enterprises the proprietor has tried to learn the results of his ventures. Through all the changes and progress in commercial conditions and methods the keynote of accounting has been to tell the proprietor the effect of his transactions on his wealth.

As the proprietor got further and further away from the detail of his transactions his agents began to take his place and the success of his business came to deepnd chiefly on his judgment or luck in selecting his principal agents. Finally we come to the modern corporation having thousands of proprietors (or stockholders) and thousands of agents (or employees), the latter because of their great number and the increasing specialization of each one's work necessarily grouped under heads and sub-heads constituting what we call an organization. In all this time until recently the direct purpose of the scheme of accounts has been to show the results of the business in terms of money and only indirectly if at all the relative value of the business of the individual.

Now it is practically established that in this modern industrial scheme the accounts should and can serve both purposes. Only to a limited extent has this principle been yet developed in telephone accounts.

There are many difficulties it is true in working this out, but progress is now being made in developing the general scheme of accounts so as to show at least the operations of the main departments of organization. This should be on such a basis that the accounts of one geographical district can be compared with those of another for the corresponding kinds of work and thus some definite tests made of relative efficiency of men responsible for similar work in different places.

As an illustration, suppose the organization includes a department charged only with the duty of making collections of subscribers' accounts and having seven geographical districts. The accounting scheme could easily show the wages and other expenses pertaining to this particular work in each district, not forgetting that rent, postage, stationery, etc., are part of the expenses. The regular problem for the head of all this collection work is how to decrease expense and maintain or improve the standard of service, for his record is bound to be compared with those of other men having similar responsibility elsewhere. He starts by comparing his expense in each district and he finds at once that District B is the highest, but he knows that this district has the largest number of subscribers. Here begins his need for a unit and his correlation of data. Suppose he takes the subscriber as his first unit. He gets the number of subscribers in each district and applying the cost per subscriber finds it highest in District C. But on further thought he questions if District C may not be making collections more promptly than the others, so he gets the figures of the month's collections as compared with the bills rendered. This data indicates that District C is the best of the seven and District D the worst. Perhaps he finds also that District D not only is losing interest by delay in collections but that its ultimate loss on uncollectibles is larger, although its expense per subscriber is low. The question is now as to the relation between loss on uncollected (including loss of interest on slow collections) and the expense of collections. By experience and study he establishes or there is established for him a tentative standard for expense and for quality of service measured in this case by promptness and completeness of collections. Then he may first require all the districts to improve their service up to the standard and in so doing finds the expenses of some districts increased, but at last he has them all at the standard of service and can begin to talk expenses. District E in charge of Smith we will say has now the highest expense and the burden of proof is right on him.

Smith is perhaps new at the work but ambitious and energetic. He analyzes the daily duties of his collectors and finds they each make so many calls,

travel so many miles, collect so many dollars and so on, and he finds some do better than others. By sundry methods of his own he applies to the individuals under him the same kind of tests that are being applied to him. He explains to them the necessity of getting about more rapidly, of making favorable impressions, and shows them how it can be done. He finds (say) five who greatly increase their efficiency while (say) three do not. But the five best men are now doing the work which eight were formerly doing. The three poorest have to go. Smith thus makes a record which kept up makes him and his methods the standard of efficiency in that work. His collectors are sought for other districts or other cities. Smith's promotion is as certain as a natural law.

I know of course that this only describes a general process you have all seen applied to some extent. I do not seek to draw from it any great moral lesson, but I venture the opinion that this simple principle of gauging men's efficiency by their records of performance is the chief cause for the superior efficiency of some corporations as compared with others, and of some departments as compared with others.

Now there are many of these records that the official scheme of accounts does not provide for. Some of them it should. Others are of such a character that their use is transitory. Still others are such that they should be published so that those who will may use them. Many of them are so small in themselves that general managers may never hear of them. But their effect on the individual is important from his standpoint and the aggregate of them may measure the difference between success and failure of the business.

One of the interesting features of this subject is that where officials have failed of their full duty in this direction the men down the line have frequently gone at it themselves. This is not altogether strange because the man on the job can see some things more clearly than the official.

It has happened, for instance, that a man who had charge of construction and maintenance work in a small city, thinking his men were not exercising good judgment in the use of materials, kept a record of the material drawn by each individual, compared it with the work done and investigated discrepancies, thereby greatly reducing the quantity of material used. Again a certain division plant superintendent started a record showing the mileage of each toll line in his district, the number of troubles per mile of wire and the total expense per section, thus showing the relative efficiency of his section linemen.

Other illustrations of this tendency have come to my attention, some of them like these two of considerable importance from a general point of view, because they immediately suggest the question whether such schemes could not be standardized and applied elsewhere.

The correct and final answer to that question can only be worked out through a comprehensive consideration of the entire routine processes of the telephone business. Often such extraneous methods grow up because other proper methods are missing or inadequate. Again, unless such statistical records have a uniform basis everywhere they miss just so much of being comparable.

For instance, the loss on inside wiring because of disconnection of a subscriber's station has been chiefly a matter of estimate, the estimates running all the way from eighty cents to five dollars per station.

The correct loss on disconnections can be obtained by means of a special routine work number, and having once been established perhaps for different classes of stations will serve to bring to light excessive costs at a particular exchange, or in a certain district or division.

It will also be valuable information for judging the advantage of the plan of leaving subscribers' equipment in place for a time in the hope that a new occupant of the same premises may want telephone service.

The same process can be applied to "drop" wiring and similar information made use of.

A comparison of the payrolls of certain exchanges or districts will indicate more economical work at one place than another, and also the relative labor costs for different but comparable types of plant, such as open wire or aerial cable. By the judicious use of such information, economies in field work can be effected and the expense and soundness of changing from one type of plant to another can be determined.

The proposed routine for material accounting provides that all material shall be carried in the supply department material account until reported used. This makes possible a monthly report by exchanges or districts of the value of material in each. It will probably be possible to establish some average relationship between the amount of material carried locally and the number of subscribers, and if this turns out to be the case, much can be done toward keeping down scattered stocks of material.

These are only a few of the possibilities in the way of getting information out of accounts by means of the standardization of routine clerical methods. The application of this general principle will undoubtedly tend toward the simplification and reduction in cost of clerical operations, but this is a by-product hardly within the scope of this paper.

Enough has been said to indicate the variety and range of statistical possibilities yet undeveloped or only partially developed in the telephone business, and to connect them with the everyday problem of increasing our efficiency.

Let us turn now to the actual use of statistical data in administration. There is on the one hand a disposition to use uncorrelated facts as proving points which have varied and often complicated elements. A warning as to the dangers and injustice of this is not out of place here.

On the other hand, there is often a reluctance to use statistical data in direct dealings with the individual. This, I believe, is partly because the administrator has not thought out to its logical conclusions just what the data means, and hence finds it easier to deal in glittering generalities.

He has also some feeling that the presentation of a disagreeable record amounts to a charge of inefficiency. In my view it is rather to be taken as a method of giving the individual an opportunity to prove his efficiency, or to show the steps he means to take to remedy his relative inefficiency.

Whenever figures showing a poor record are put

up to any man his first natural impulse is self-defense, and the form of his defense in a great variety of expression quite commonly amounts to one or both of these two explanations:

1. The figures lie.
2. My conditions are different.

Now since either of these excuses may have some degree of validity, let us examine them further.

The excuse that the figures lie is rather dangerous, since the true figures may be even more damaging than the false. No one should have the temerity to make this answer, unless he has at least some circumstantial evidence to support it. Such evidence ought to be followed by a refiguring. Suppose such evidence is plausible enough to put the burden of proof on the man who prepared the figures. He should then outline the sources from which the figures are derived, and his reasons for his method of figuring. His reasoning should be accepted unless better reasoning is shown. His sources of information, if unbiased, should be accepted unless shown to be erroneous. If the information comes from a biased source it should of course be corroborated by other and unbiased evidence.

Again it is usually possible for the administrator by simple processes to decide whether any given figures are substantially accurate or substantially inaccurate. This, for the purpose of testing individual efficiency, is more important than arithmetical accuracy.

But suppose the net result of the discussion along these lines as to any particular figures is that inefficiency is not proved. None the less the burden continues to rest on the individual to prove that he is efficient.

The plea that different conditions extenuate an apparently poor record should not carry much weight unless there is some evidence that the difference in conditions compares fairly with the difference in records.

Of course no two situations in the telephone business are exactly the same, but the end and aim of all our telephone service is fundamentally the same; we all have about the same chance at getting informed about our work, and we all have some responsibility for our conditions being what they are.

It is true that we all have some peculiar advantages and some peculiar disadvantages as compared with each other.

But a careful analysis of differences in conditions will, I think, generally result in exposing differences in the efficiency of men in dealing with their conditions, assuming of course that all the data has been properly correlated.

Now if these principles are accepted, viz.: that efficiency is the vital thing, that it is to be gauged in the whole business, the company, the department and the individual by significant facts, and that significant facts are largely statistical facts, then the question is what can we do to get and use statistical facts for this purpose? Are we going to wait until some one comes along and tells us just what to do and how to do it? Those who wait will be left behind.

Can accountants and statisticians ever master all the ideas, practices, operations and possibilities in the detail administration of the business and formulate a statistical method for every piece of work? Probably not.

The knowledge of just what details are needed comes only through daily contact with the problem,—such contact as only the field forces and the detail administrators can get. The accountant can simplify and harmonize processes and can develop, arrange and interpret general data, but the field for study and interpretation of specific data applying to his own particular work lies open to every man ambitious enough to enter it.

Electrical developments in Uruguay are under the direction of the chief electrical engineer of the government, an Italian, who is under contract for a term of years at $620 per month, and whose position will ultimately be filled by an Uruguayan. The resident engineer for the Sociedad Comercial, a Canadian, receives about $350, and the chief engineer for the Sociedad Transatlantica about the same. All the other positions are filled by Uruguayans, with salaries ranging from $50 to $80 per month. The policy of the Uruguayan government is to send young men to Europe to be trained for electrical engineering, who, on returning to this country, are placed in government positions. Hence, the opportunities for young men from the United States are limited to times when new works are being erected, as only then the skilled foreigners are employed. Such positions have been available, but are now closed, as the new works are practically completed. It is the intention to change the horse tram line to an electric system, and the port authorities eventually will erect electric cranes and install an electric light service along the wharves. The general use of eectricity as a motive power, as promised by the enlargement of the government plant and the great reduction in the price of current, will lead to the sale of a large number of small electric motors and a vast quantity of electrical supplies. In such a field there appears to be an opportunity for the establishment of supply houses through which a large and permanent business may be built up. It is in that direction that the efforts of electrical engineers from the United States will be most successful. There are three tram systems in Montevideo, two having electricity for motor power, viz: Sociedad Comercial and Sociedad Transatlantica, and one, Tramvia y Ferrocarril del Norte (horse traction within the city and steam beyond), owned partly by the Uruguayan government and partly by private parties. In Montevideo there are about 15 electric light plants and several small power plants used in printing establishments. In the outskirts there are several electric light plants, not used in the winter, while there are small electric light plants in half a dozen cities in the interior, and about 15 connected with slaughtering establishments. The immense plant used in supplying light to Montevideo, owned by the Uruguayan government, has recently been very much enlarged, so that now the power generated is sufficient for lighting the city and suburbs, including private lighting, besides furnishing power to all those now using private plants.

IS THE CONSERVATION CHARGE AN EXCISE TAX?[1]

BY FRANK H. SHORT.

For the purposes of this discussion we assume and individually agree that the policy of reserving the forested lands of the United States and permitting the removal and use of the forests and forest products in such a way as to conserve and continue this resource and perpetuate the forest growth and the forest cover is a wise policy and one of sufficient importance to justify in this particular instance an exception and departure from the otherwise universal and desirable rule that the public lands and resources shall as rapidly as possible be conveyed to, and with as wide a distribution among the people, as is possible.

We observe, however, no sound reason why this rule and necessity for the reservation of the forested lands should in any degree indicate or necessitate a change in any other respect in the policy of the Government of the United States or engender upon its part a disposition or call for the initiation of a policy of restriction and charges upon the enjoyment of local resources which would otherwise have been free, or comparatively so.

The policy of the United States Government hitherto has been to allow all such local developments, including wagon roads, railroads, telegraph and telephone lines, and especially canals and ditches and other appliances and privileges for the diversion and beneficial use of water to be exercised and enjoyed freely and without charge, thus encouraging and aiding the development of local resources, the growth and advancement of the country and extending the opportunities and cheapening the cost to the people of the various states and communities of the United States. We believe this policy to have been a wise one and that its continuation would have been desirable. Assuming, however, that the United States Government has changed, or desires to change, this policy, and that it has a right to do so, the limitations within which this can be done without violating the spirit, if not the letter, of the Constitution and the rights of the various states as amongst themselves becomes a serious question of law as well as of policy, and in this connection we state the rule that we believe will govern the ultimate decision of this question that the outside limitation of any policy that could be constitutionally adopted by the United States would be to impose upon the various states wherein these public lands are situated and the people resident therein obligations equal to those which could have been imposed if the lands had passed to private ownership, but not obligations in excess thereof for the following reasons:

If immediately after the adoption of the Constitution the United States Government had taken the position and adopted the policy that it could so far as it was then or afterwards become the owner of the public lands impose upon the people of the various states as a condition precedent to the enjoyment by them of the resources assumed to be theirs all such charges by way of exactions and rentals as the circumstances would allow, including the charge of what the "opportunity" was worth to have access, ingress and egress to and from the rivers and streams and the opportunity upon public lands, to appropriate and enjoy the beneficial use of the waters of their rivers and streams for all substantial bona-fide purposes. Section 8 of Article 1 of the Constitution, in so far as it requires uniformity of taxation, would have been repealed and would have become a nullity. The general principle underlying the doctrine of eminent domain and the compensation allowed to an individual owner for the use of property for public purposes is what is the land proposed to be taken worth to the owner for any usual business or purpose for which the owner might desire to use or sell the same, and this is arrived at not by determining what the property or privilege when acquired will be worth to the person or corporation desiring to devote it to a public use, but what is the value of the land prior to such taking or use and what will be its remaining value to the owner after it is subjected to the desired taking or use by the process of eminent domain.

The imposition here sought to be made bears no possible relation to this consideration at all. The situation might be, and frequently is, that an individual or association of individuals or a corporation has acquired the right to appropriate and use certain quantities of water under state laws. What is desired may simply consist in the right to run an aqueduct under the ground, construct a ditch over or drill a tunnel through a hill, and when such work is completed it may be agreed in many instances that the land to the United States or any other owner will be worth exactly as much as it was before the desired work was done or the desired structure or structures installed. If the detriment is anything it is reasonable that whatever it is it should be paid, but if it is nothing at all then nothing should be paid. We could conceive of no more efficient or vicious power of taxation than the power of the sovereign owner of the public lands to say to the people of a state or corporations incorporated under its laws, "You have here the right to appropriate water from a stream and apply it to the development of your internal resources of the value of many millions of dollars; but as sovereign we own the adjacent public lands, and you cannot avail yourselves of the opportunity to use these resources without paying us such compensation as we may exact, and, therefore, we will not charge you the difference between the value of our land before and after your improvement is installed, but we will charge you by exacting an annual contribution upon the product or otherwise such charge as we shall determine is reasonable for the "opportunity" to do what you otherwise cannot do, although you own the water, the element with which the beneficial result is to be accomplished, and by the force of which the product is to be manufactured." If this is not taxation in its baldest and most arbitrary sense we do not understand the meaning of the word. And if the Federal Government had arrogated this power

[1]Extract from brief "with respect to rights of way over national forest reserves, etc., with especial reference to rights of way for electric companies."

to itself and had exercised it from its foundation, the original thirteen states (within which as we understand it there were no public lands and other states like Texas, in which there were no public lands) would never have been required to have paid any tariff, internal revenue, income, inheritance, corporation, excise, impost of other taxes, but could have with perfect complacence and within the limitations of absolute reasonableness as to any one charge have collected all of the revenues that the Government has ever needed, now does or ever will need by simply charging the people of the other states what amounted to "a reasonable charge for the enjoyment of the privileges necessary to be enjoyed, the opportunity in connection with obtaining the consent of the general Government to these necessary uses on the public lands."

The Ultimate Power Source.

The subject of equal taxation and the rights and methods of its exercise have been the subject not only of a vast amount of consideration and study in the process of their adjustment, but of the most bitter controversies that have arisen between different nations, and especially between the different political sub-divisions, parts or sections of the same country.

Understood, analyzed and reduced, even assuming that as now proposed to be imposed, the charge or tax measured upon the electric power generated by the streams within the forest reservations is so small that it would be of no serious importance, nevertheless it would amount to the recognition of a principle utterly destructive of all rights of equal taxation and permitting in its inception, and especially in its enlargement and development, the imposition in an unequal sense and in a most gross and unjust form the unequal power of taxation as to all states in which public lands still remain and the citizens thereof in direct contravention of the express and implied provisions of the Constitution of the United States. We therefore, submit in this connection that whenever the United States Government seeks to impose any charges in connection with the public lands, and especially in connection with any desired use thereof where that desired use is essential to the enjoyment of some other right, the carrying on of some business or the utilization of some other resource of the State beyond what would be possible under private ownership, that by such proceeding the United States is not only impliedly, but expressly, violating the Constitution by imposing an excise charge within such States and upon such enjoyment of its resources and upon its people that is not uniform throughout the United States. A charge that could only be imposed upon those unfortunate States and their citizens within which public lands still remain.

* * * * * *

It has frequently been asserted that this charge is so small and reasonable as to amount to, what might be termed, a negligible quantity. If this were

so, however, and if it were intended to so continue, it would have to be conceded that a charge that was so trivial as to be unimportant to the interested manufacturers of electric power and its consumers and the people of the State would likewise be unimportant to the Government of the United States, and if it is important to the one it is important to the other, and it is hardly consistent to advocate and insist upon the charge and then urge that it is so unimportant as not to deserve consideration.

The charge, however, considered and measured as a tax, is a large and important charge. The proposed charge where no elements of deduction enter into the consideration and where electricity in any considerable amount is produced will amount by the time the company can be in a position to do business to 10 cents per thousand k. w. h., increasing under the provisions of the permit to 27½ cents per thousand k. w. h. and with no limitations or restrictions after a certain period of time. As based upon existing productions of electricity and returns received therefrom, it has been conservatively computed that this charge at 10 cents per thousand k. w. h. would amount to nearly 2 per cent on the gross income of the producing company and at 27½ cents to over 5 per cent on the gross income of the company.

It may be observed in passing that there is at this time pending before Congress a proposition to impose a tax of 2 per cent on the net income of corporations and this proposition is regarded as a matter of no inconsiderable interest and importance, although it will be agreed, we think, that on the average a tax of 2 per cent on the net income would not be more than the equivalent of one-fifth of the same amount one-tenth of one per cent on gross incomes. It will also be observed that a tax of from 3 to 4 per cent on gross incomes is considered a very large tax to be imposed upon corporations in the states where such tax has been substituted for all other taxes for state, county and local purposes, so that it is hardly compatible with reason that a tax that would amount to from 2 per cent to 5 per cent on the gross income derived is not only not an inconsiderable tax, but is a very large and substantial tax upon industry.

A tax of 4 per cent on a gross income would frequently amount to one-half of the total profits of a reasonably successful business, and if the United States Government could become a silent partner without investment and realize half or even one-tenth of the profits of the general industrial business of the country it would certainly be doing a very fine business at the expense of the industries of its own people.

One of the most serious and definite legal features of this controversy is what appears to us to be the obvious invasion by the Federal Government of the power of the state to tax it own resources and regulate its own corporations. It is well recognized, and, as we shall show shortly in a separate sub-division, well settled by the courts that the right to water diverted for beneficial uses within the states is acquired under state laws and is subject to regulation by the state and also to taxation. The state of California recently proposed through its legislature, which was not passed, however, by the people, a constitutional amendment, proposing in substitution for all other charges and taxes, a tax upon the gross incomes of corporations of the class here under consideration of 4 per cent, which we may assume to be a reasonable exercise of the taxing power. It must also be taken into consideration that the persons or corporations exercising these privileges pay in equal proportion with the other citizens or corporations of the United States all of the taxes imposed by the Federal Government and now pay, and if such amendment had been adopted would continue to pay, a like reasonable and equal tax for state, county and local purposes. Therefore, if this special charge or tax were imposed, measured by the product of water also to be regulated and taxed under state laws, would it not result either in a tax prohibitively high, practically destroying or rendering the business unprofitable, or else imposing the obvious necessity of an equal enlargement and increase of the cost of such electricity to the consumer so that if there were other available sources of power in competition the business of the company would be unequally taxed and rendered unprofitable. If there were no such competition from other sources, then the consumers would naturally and necessarily have to pay an additional cost or price and it would then result in their being taxed in an equal and unreasonable way.

The State of California has under its constitution and laws and through its legislature and municipal authorities by constitutional and legislative enactment the power, and it is its duty and the duty of its municipal officers, to regulate the charges where water is furnished for beneficial purposes or where electricity is produced and similarly furnished. In fixing these rates the state and its officers must take into consideration all of the elements that enter into the cost of producing, distributing and delivering water or the products of water, including electric power. It is a matter of mathematics and as plain as A B C if this federal charge is imposed upon the development of electric power in forest reserves wherever and whenever the state or the municipalities of the state come to regulate and fix the charges thus to be allowed and imposed that they will have to allow for and add to the charge so fixed the full amount of the tax so charged, imposed and collected by the Federal Government, thus directly affecting and interfering with the power of the state to impose and collect revenues upon its own resources and from its own people and also interfering with and limiting its power to fix and regulate the charge and cost of such products to its own people, and a condition not existing or proposed in any State having no reserved lands.

The sub-marine cables of the world total 278,208 miles distributed among 2053 cables, three-fourths of the total mileage being owned by private companies.

Silicon alloyed with iron improves its magnetic qualities, reducing the losses due to cyclic reversals of magnetism and giving non-aging qualities. It also increases the resistance for rheostat use.

JOURNAL OF ELECTRICITY
POWER AND GAS

PUBLISHED WEEKLY BY THE

Technical Publishing Company

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TERMS OF SUBSCRIPTION

United States, Cuba and Mexico	per year.	$2.50
Dominion of Canada	"	3.50
Other Foreign Countries within the Postal Union	"	5.00
Single Copies, Current Month	each	.10
Single Copies, prior to Current Month	"	.25

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PACIFIC LUMBERMAN, CONTRACTOR AND ELECTRICIAN

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The government's recognition of the advantages of firing with fuel oil will probably lead to the establishment of a number of supply stations for the ships of the navy. Instead of coaling these will be oiling stations.

The members of the American Society for Testing Materials are now balloting upon the adoption of standard specifications for hard drawn copper wire. These specifications have already been adopted by the members of the reporting committee, which includes most of the great wire manufacturers who recognize the confusion arising from the present practice. It is hoped that this standard will be adopted by the trade in general.

Alarmists, who would discern graft even in the actions of the Almighty, are busily engaged in assigning ulterior purposes to members of the Department of the Interior in its bargain with the Hammon hydroelectric interest, whereby the outlet of Lake Tahoe is surrendered to the government in return for certain privilges that will aid in the development of electric power. The government in many dealings with its people must sometimes become as one of them.

The Underwriters' prayer—"Lead us not into temptation"—has been granted by the electrical manufacturers who have agreed to abolish switch sizes differing from the regular fuse sizes. This will do away with the pernicious practice of using 100-ampere fuses with 80-ampere switches. In accordance with the Underwriters' rules the ratings hereafter will be 30, 60 and 100 ampere; the manufacturer of the 80 ampere switch being discontinued, with strong probability of like action on the 150, 300 and 500 ampere sizes.

With the impending crisis of a street railway strike in Chicago, called primarily to force the principle of the "closed shop," the leaders well might consider the ideas promulgated by Dr. Dudley in the course of his presidential address to the American Society for Testing Materials in which he says: "We are firmly convinced that if labor organizations would devote less time and energy to contention with employers and more effort toward making the organization stand for skill and plain, simple honesty in workmanship, and for dealing with and reasonable devotion to, the interest of employers, all questions connected with the recognition of the union would fade into insignificance, and collective bargaining would be welcomed, nay even sought for, by those who are managing the great industries of our modern civilization."

This week the United States Circuit Court of Appeals handed down a decision of great interest to electrical men in general and telephone men in par-

ticular. In the case of the Pacific Telephone and Telegraph Company against the town of Pomona, in Southern California, they decided that the town had no constitutional right to charge the telephone company for a franchise to operate within the town limits. The court further decided that the telephone company had a legal right to erect poles and establish their service within the town limits, provided that the corporation complied with such regulations as might be in force and part of the government of the muncipality. This reverses the judgment of the United States Circuit Court of the southern district of California, where Judge Welburn decided in favor of Pomona. The opinion was written by Circuit Judge Ruskin M. Ross and concurred in by Circuit Judge W. W. Morrow; Circuit Judge W. B. Gilbert dissenting.

Electricity in Irrigation

Sixty years ago the inhospitable wastes of the Great American Desert were regarded merely as a barrier to the prairie schooner and the pony express straining for the Eldorado beyond. Today the rail is the trail and the decapod the ox traversing an inland empire constituting two-fifths of the area of this country and forming the basis of a substantial agricultural prosperity. The transforming elixir in this "before and after" scene is water, wisely conserved and judiciously distributed.

The first people to develop the latent possibilities of the fertile soil were the Mormons at Salt Lake. Many an argonaut, disappointed in his search for gold, did likewise and found a more enduring fortune. The land is arid but it is not desert. The soil is fertile and lacks but moisture to bring forth abundant vegetation. Cloudless skies allow the sun's heat to force plant growth to rapid fruition and water, artificially supplied, eliminates chance of the crop being spoiled by rain.

Instead of clouds there are snow-capped mountains and ideal reservoir sites that require but the connecting link of the ditch or pipe line to supply water when and where needed. There is, however, much fine land above the level reached by irrigating canals. Even where it is possible to seek a higher source it is often cheaper to pump from the ditches than to build a longer line. It is here that the simplicity and reliability of the electric motor forms an indispensable adjunct. Much of the electric power used in irrigation is generated by water. It seems fitting then in turn that it be used as motive power for pumping, thus in a way liquidating its debt.

The irrigation is of such magnitude and so expensive as to be beyond the scope of private enterprise and consequently there is no finer work being carried to completion than the great irrigation projects that have been undertaken by the United States Reclamation Service. As these are gradually finished, the power companies, supplying energy in districts thus benefited, will find the farmer to be their best consumer.

Futility of Conservation

Dire prophecies of an impending fuel famine and approaching timber scarcity have been as numerous as similar predictions of an immediate millenium. This week the "Coon eyites" are awaiting the end of the world in Ireland, last week another cult held its seance in Maine, and it is nearly time for the frenzied followers of some self-appointed apostle to form a new suicide club. Some staticians infer that if our present rate of consumption of wood and coal should continue unchecked our great grand children will gaze upon a piece of coal with as much wonder as we look at the skeleton of a mastodon, and will gather around a tree with the same awe with which we surround a buffalo paddock. Happily for our peace of mind, steps are now being taken to preserve a remnant of this great heritage of natural resources for those who come after.

But suppose, for the sake of argument, that such was not the case, that in our heedless and selfish indulgence of the bump of destructibility all coal and wood should be destroyed. What difference would it make? Why is it that every day an electric cooker displaces a coal range and a concrete sidewalk takes the place of a board-walk? Are not these substitutes better than those methods they supersede?

The Southern Pacific Railroad is debating whether eucalyptus will flourish in the heat of the Imperial Valley. Yet even the quick-growing propensities of this species will not bring it to maturity before our great railroad system will be employing concrete cross-ties. France is already making extensive use of reinforced concrete telegraph poles and the teredo that will attack a concrete pile is yet to be invented. Modern demands for a fire-proof building material make wood out of the question, as the chemist's problem of fire-proofing wood is even more hopeless than that of the postoffice department in seeking an indelible ink for cancellation.

These substitutions are being made, not for the reason that wood is scarce, but that concrete is better. In like manner, with the cheapening of electricity there is no use to which coal is put today in either domestic or commercial work that could not be better accomplished by electricity. Thus it is seen that neither fuel nor timber are indispensable.

But because of this "cry of wolf" which is among us is so needless in the case of coal and wood, it does not mean that we should disregard similar warning of the danger to our water supply. In running away from one danger we are unwittingly escaping a worse fate, for forestation is of great aid in regulating water run-off and it postpones the necessity of building expensive reservoirs, also of concrete. Water is fundamentally essential to life and any means that even indirectly conserves it should be fostered.

PERSONALS.

C. T. Ryland of the Sonoma Valley Company was a visitor in San Francisco during the past week.

Samuel Fortier, head of the U. S. irrigation bureau, is on an annual trip of inspection, now being in California.

H. F. Frosch of San Francisco is home again from a business trip of two weeks in the vicinity of Los Angeles.

Ed Sherman has joined the motor sales department of the San Francisco office of the General Electric Company.

James M. B. Irvine, Los Angeles representative of the Electric Appliance Company, spent the early part of this week in San Francisco.

R. D. Holabird of the Holabird-Reynolds Electric Company, San Francisco, left for Seattle on August 2d and will return early next week.

A. E. Rowe, city sales manager for the Electric Appliance Company, San Francisco, has returned from a two weeks' pleasure trip in Southern California.

W. H. Seaver, assistant Coast sales agent of the American Steel & Wire Company, San Francisco, has returned from an extended trip through the east.

Allen Lee Haase, general sales manager of the Harvard Electric Company, Chicago and New York, is now on the Pacific Coast combining business with pleasure.

Garnett Young of the San Francisco office of the Telephone & Electric Equipment Company has returned from a vacation trip of several weeks at Ocean Park, California.

A. W. Vincent, sales engineer with the San Francisco office of the Cutler-Hammer Manufacturing Company, Milwaukee, Wis., has returned from a trip of six weeks through the Northwest.

Henry E. Paine, manager of the electrical department of Hughson & Merton, San Francisco, left last week for a trip of four weeks through the Northwest; which will include Portland, Seattle and Spokane.

George A. Scoville of the San Francisco office of the Dean Electric Company, has returned from a trip of five weeks through Southern California, two weeks of which was devoted to pleasure and recuperation.

A. B. Thompson and O. L. Coward have recently joined the supply department of the San Francisco office of the General Electric Company, Mr. Thompson being railway supply man and Mr. Coward traveling in Nevada.

F. C. Todd, who has been connected with the telephone department of the Western Electric Company at San Francisco has been transferred to the sales department as traveling salesman and is now covering the northern part of California, Oregon and northern Nevada.

L. B. Dixon, who is well known upon the Pacific Coast through his recent connection with the telephone department of the Western Electric Company, was married under date of July 26th, to Eda, daughter of Mr. and Mrs. G. S. Lord, Evanston, Ill. Mr. and Mrs. Dixon have reached the Coast and will make their home on Mr. Dixon's fruit ranch at Riverside, Cal.

W. S. Dix, who spent several months of last year upon the Pacific Coast with headquarters at San Francisco as sales engineer for the R. Thomas & Sons Company, manufacturers of high tension insulators at East Liverpool, O., has located permanently at Portland, Ore., with an office in the Corbett Building. Mr. Dix will devote his time to engineering work of a special nature.

JOURNAL PORTRAITS

E. C. Jones, gas engineer for the Pacific Gas & Electric Company, comes from a family of gas men, his father, Mr. Edward Jones, having built the first gas works in Lowell, Cambridge, Worcester, Providence, Richmond and other cities in the New England States. He was born in Boston, Mass., on February 8, 1861, and at the age of sixteen entered the employ of the South Boston Gas Light Company. Being of a natural mechanical and inventive turn of mind, his rise in the intricacies of coal gas making processes at that time was very rapid, and within two years he had invented the "Jones Photometer," an instrument of such simplicity that it sprung into use as an invaluable adjunct to every gas plant throughout the world.

At twenty-two he was appointed assistant superintendent of the South Boston Gas Light Company, which position he retained until 1885. He became superintendent of the Boston Gas Light Company on March 8, 1889, and on January 27, 1890, was appointed assistant engineer of that company.

In 1890, the San Francisco Gas Light Company desiring some one to take charge of the construction of the large installation at their North Beach works, called him from his

Edward Campbell Jones

labors in the east, and on May 1, 1891, he assumed the duties and responsibilities of assistant engineer of that company, and when, later, the Edison Light and Power Company merged with the San Francisco Company, Mr. Jones became engineer of both the gas and electric departments. On March 1, 1902, he accepted the position of Chief Engineer of the California Central Gas and Electric Company, and upon the absorption of that company by the California Gas and Electric Corporation, he became chief gas engineer of all of its plants, and on January 1, 1906, again returned as chief engineer of the San Francisco Gas and Electric Company, at the time of the purchase of that company by the Pacific Gas and Electric Company.

His particular field of work in later years has been the development of the crude oil water gas process. In 1906 he undertook the erection of a plant for the San Francisco company for the manufacture of gas by that process, which called for a high degree of ability, original thought, and in many ways a daring experiment, namely, that of building generators which would have a daily capacity of four million cubic feet. The result of his efforts have been shown in the plants of the San Francisco company and that of the Oakland company.

He has been largely instrumental in the development of high pressure gas distribution in all of its phases. He has been the father of out-of-door gas works, defying old-time principles, by building purifiers and gas works without any other covering that the sky.

TRADE NOTES.

Geo. J. Wellington, constructing engineers, Alaska Commercial Building, San Francisco, have the contract for wiring the new Colonial theater of San Francisco, and will install Cutler-Hammer Simplicity Dimmers.

Otis & Squires of San Francisco, representatives in California for the Knoblock-Heideman Manufacturing Company, South Bend, Ind., manufacturers of ignition devices, have extended their agency arrangement to include Oregon and Washington, and now represent that company upon the entire Pacific Coast.

The Harvard Electric Company, 66 W. Van Buren street, Chicago, announces that after September 1, 1909, its Chicago office and factory will be located at 523 W. Van Buren street, where with greater quarters and more adequate facilities it will be better able to take care of its rapidly increasing business. The Eastern office will continue at 136 Liberty street, New York City, in charge of John J. Waldman, Eastern manager.

At the July directors' meeting of the Crocker-Wheeler Company, manufacturers and electrical engineers, Ampere, N. J., held at the New York office of the company, Dr. Schuyler Skaats Wheeler was continued in the office of president and the following officers were elected for the ensuing year: Vice-President, Gano Dunn; 2d Vice-President, A. L. Doremus; Chief Engineer, Gano Dunn; Secretary, Rodman Gilder; Treasurer, W. L. Brownell; Assistant Treasurer, G. W. Bower.

The Allis-Chalmers Company, through their San Francisco office, closed a contract recently with the Great Western Power Company for 15 transformers aggregating approximately 3000 k. w. capacity; transformers being oil filled, self-cooled and designed to operate on a 22,000-volt, 60-cycle, three-phase circuit. This contract was awarded on a competitive basis after an investigation of the record of the performance of the high tension transformers which have already been installed by the Allis-Chalmers Company in this district.

ELECTRICAL MEN'S OUTING.

The principal event of the first "Electrical Men's Outing," held at Santa Monica Canyon, June 19, 1909, was the baseball game wherein H. V. Carter caught two flies, C. B. Clay caught one and H. B. George of the Western Electric Company and W. M. Fagan each made a home run. With all of this excellent playing the game was lost to the Jobbers and won by the "Contractors" with a score of 6 to 5.

The umpiring was officially done by Arthur Ballard and Deacon Pyle. While the "Jobbers" claim that they were discriminated against, the "Contractors" claim that the umpires were a great deal more lenient with the "Jobbers" than they should have been.

The prizes which were awarded to the fortunate winners in the various contests were donated by the various electrical houses in the city. These prizes consisting of some very beautiful portables, curling irons, flat irons, etc.

The entertaining fund, amounting to $50 in cash was also donated by the various houses, each one contributing $5. This amount was raised within five minutes' time, which readily shows the enthusiasm in the event.

The following were the committees which handled the affair and to whom a great deal of credit is due:

Transportation Committee—"Matchless" Lithipe, "Curly" Arbogast, "Lovely" Currier.

Sports Committee—"Lonesome" Pyle, "Solemn" Baker, "Noisy" Fagan.

Director General—"Habitual Collector" Bowers.

NEW CATALOGUES.

The Hill Clutch Company of Cleveland, Ohio, has issued an attractive booklet entitled the "A. B. C. of Engineering," wherein they tell the advantages of their power transmission apparatus.

The Electric Appliance Company, San Francisco, is distributing an interesting bulletin describing the Adams-Bagnall Regenerated Flame Lamp. The claim made of long life, being 70 hours with one pair of carbons, is something novel and entirely new.

The American Electric Fuse Company of Muskegon, Mich., announce that they have entered into the manufacture of black enameled wire, which has been some years under development and has now reached the point where it can be offered to the trade. Interesting facts in connection with this wire are included in a small pamphlet they are distributing on the subject; a second pamphlet describing the American Igniter for gas engine work will be found of interest to those engaged in this industry.

The Electric Appliance Company of San Francisco in conjunction with their offices at Chicago, New Orleans and Dallas, are distributing their 1909-10 catalogue No. 30, just received from the printer. This is one of the most complete catalogues of electrical supplies ever published, being substantially bound in cloth and including 974 pages. An examination of this catalogue and a comparison of the volume of matter with matter contained in catalogues previously issued by this house will give one an idea of the wonderful development of this line of business. This company also has ready for distribution their loose leafed price list which is intended for use in connection with the above catalogue.

The 1909 catalogue of the Nelson Valve Company, Wyndmoor, Philadelphia, which has just been received, is an unusually attractive piece of typographical work; it is substantially bound in boards, lettered in gold and printed on an excellent grade of book paper; the print being in black outlined by an arrangement of rules in orange. It is conveniently divided into three sections covering Bronze Valves, Iron and Steel Valves and Accessories and Fittings, each section including full details of its particular subject. The very complete data given in connection with their product and the accompanying telegraph code with an elaborate index includes unusually complete information in this line. Gilhuly & Ambler, Atlas Building, San Francisco, are the Pacific Coast agents for this company.

The following new bulletins have just been issued by the General Electric Company:

Bulletin No. 4674 illustrates and describes its polyphase induction motors and the controlling apparatus for use with them. An interesting illustration in this bulletin is that of a 6000-horsepower, 6600-volt induction motor installed at Gary, Indiana.

Bulletin 4679 describes a new line of commutating pole constant speed motors which the company is placing on the market. These motors are made in both slow and moderate speed types, in capacities of from 20 to 250 horsepower in the former, and 30 to 350 in the latter. They can be operated entirely open, semi-enclosed, or totally enclosed, and may be installed on the floor, wall or ceiling. The bulletin gives a detailed description of these motors.

The managers of printing establishments should be interested in Bulletin No. 4672, entitled "Electric Drive for Large Printing Presses," inasmuch as it has to do with a subject of vital importance to the up-to-date printer. This bulletin refers to certain electrical installations used in connection with this work, and describes the most modern method of operation and control of large presses.

NEWS OF THE STATIONARY ENGINEERS.

PREAMBLE.—This Association shall at no time be used for the furtherance of strikes, or for the purpose of interfering in any way between its members and their employers in regard to wages; recognizing the identity of interests between employer and employe, and not countenancing any project or enterprise that will interfere with perfect harmony between them.

Neither shall it be used for political or religious purposes. Its meetings shall be devoted to the business of the Association, and at all times preference shall be given to the education of engineers, and to securing the enactment of engineers' license laws in order to prevent the destruction of life and property in the generation and transmission of steam as a motive power.

California.

No. 1. San Francisco. Thursday, Central Hall, 124 Fulton St. Pres., A. C. Arbuckle. Sec., Herman Noethig, 900 York St.
No. 2. Los Angeles. Friday, Eagles' Hall, 116½ E. Third St. Pres., Gabriel Allen. Fin. Sec., Harry Notthoff, 1307 Winfield St. Cor. Sec., W. T. W. Curl, 4103 Dalton Ave.
No. 3. San Francisco. Wednesday, Merchants' Exchange Bldg. Sec., David Thomas, 914 O'Farrell St.
No. 5. Santa Barbara. Geo. W. Stevens, 2417 Fletcher Ave., R. R. No. 2.
No. 6. San Jose. Wednesday. Pres., W. S. Pierson. Sec., Leal Davis, 350 N. 9th St.
No. 7. Fresno. Pres., J. F. Wagoner. Sec., F. J. Whitney, Box 8.
No. 8. Stockton. Thursday, Masonic Hall. Sec., S. Bunch, 626 E. Channel St. Pres., Jos. Gieger.

Oregon.

No. 1. Portland. Wednesday, J. D. Asher, Portland Hotel. Pres., O. H. Reed.
No. 2. Salem. A. L. Brown, Box 166.

Washington.

No. 2. Tacoma. Friday, 913½ Tacoma Ave. Pres., Geo. E. Bowman. Sec., Thos. L. Keeley, 3727 Ferdinand St., N., Whitworth Sta.
No. 3. Walla Walla. 1st and 3d Wednesday, German Hall. Pres., W. M. Quinn. Sec., O. L. Compton, Box 11.
No. 4. Spokane. Tuesday. Pres., Grant Tuttle. Sec., J. Thos. Greeley, 0601½ Cincinnati St.
No. 6. Seattle. Saturday, 1420 2d Ave. Pres., J. H. Beckman. Sec., J. C. Miller, 1600 Yesler Way.

Practical letters from engineers and news items of general interest are always welcome. Write your items regardless of style. Communications should be addressed to the Steam Engineering Editor.

NOTES.

D. E. Brewer of San Francisco No. 1 is at present in Fresno County working for the Associated Pipe Line Company.

Former Secretary Peery of San Francisco No. 1 has returned from a vacation taken on account of ill health. He resumed his duties as engineer of the San Francisco postoffice and feels greatly improved after his trip.

It is understood by a letter received from Los Angeles that W. T. W. Curl, Secretary of California No. 2 of Los Angeles, will be a candidate for election for the office of secretary and treasurer of the life and accident department at the National Association's Convention to be held at Columbus, Ohio, in September.

On account of ill health, A. C. Arbuckle, president of San Francisco No. 1, has been compelled to take an extended vacation. He left on the United States Transport Sheridan for Manila and other ports on August 5th. It is sincerely hoped by all the members that he will return to take up his duties within a short time.

If all the members of the Association in California would take as much interest in keeping the column entitled "Practical Letters from Engineers" up to date, as the member writing the article for the issue of July 31st, and the article written for this issue it would surely be made a success. Send from time to time articles of interest and questions to be answered. They will be taken care of by the steam department.

A joint meeting of San Francisco No. 1 and California No. 3, was held at the hall of San Francisco No. 1, 124 Fulton street, to listen to the final report of the Joint State Convention Committee. About 135 members attended, demonstrating the importance of the Fair Committee's final report. Chairman Ennor read off in brief the transactions of the Committee. John W. Maher, now Past President of No. 1, who appointed the committee, spoke in glowing terms of the committee's remarkable work and finally discharged them, with the hope that they would continue as a committee in the future for the benefit of the Association and anything which might transpire in any way to preserve the now existing harmony and good fellowship between the Associations.

Past President Milner, California No. 3, then spoke of the good work the Fair Committee had accomplished, the advertising the Association had received through the success of the Fair, and the benefit the engineering supply houses received. Past President Milner did not discharge No. 3's committee (for the appointment of which he was responsible) but said that the committee should continue indefinitely and hoped they would in future meet and discuss all matters of interest to the Association. He spoke at length of the success of the Fair Committee's work and on behalf of No. 3 heartily thanked the committee for the business ability they had shown throughout their deliberations.

Chairman P. L. Ennor of the joint State committee responded to the remarks of the past president and said that as he had been elected chairman of the committee, by the committee, he could really say no more than what he had read from the report as that spoke for itself. He refused to take any of the credit himself on the ground that his duty was only to prevent two members from speaking at one and the same time.

Junior Past State President H. D. Saville was then called upon and spoke on the Good of the Order and of the importance of all stationary engineers wherever they may be to become a member of the National Association; it benefits them individually and aids them in becoming proficient in their profession so that it is a guarantee to the employer that they are competent to take full charge of any position as an engineer.

Twenty-seven members were initiated. After the ceremony of initiation had been completed the members adjourned in a body to the banquet hall, where they were entertained with refershments and music, furnished by the Monroe family, singing and dancing by the Mintie sisters, and a Scotch dance in costume by Miss Pratt.

Past Secretary Peery of No. 1 was presented with a watch fob in token of his services as secretary to the Association for the last few years and both Associations were presented with a framed group picture of the members of the Joint State Committee neatly arranged with the name of each member embossed beneath his photograph. Short talks were also given by Brothers Pratt, Elsasser, Arbuckle and Elwell.

THE STEAM PUMP OR THE AIR LIFT—WHICH SHALL I USE.

This is a question which is of a good deal of interest to the operating engineer and furnishes much food for thought. An engineer in charge of a plant now-a-days is called upon, in many cases, in fact I am glad to say in many more cases at the present time than in the past, to render decisions on the details pertaining to the erection of the machinery coming under his supervision; and I may say here that if the operating engineer were consulted by the owners of plants more so than he is, and his advice, based on years of experience, carefully listened to and followed, steam users would undoubtedly be benefited in many ways, and the running expenses of many plants would be cut to a figure which might perhaps be quite gratifying and somewhat astonishing. One

of the great expenses connected with the operation of a plant in a modern building, say a hotel for instance, is the water bill. Whether the bill be paid to the water company or whether it be charged to the engineer's department for the pumping of the water and the up-keep of the pumps. A deep well, while in many cases a great blessing, is sometimes one of the most unsatisfactory adjuncts to a steam plant. The well having been bored, is found to contain water entirely unsuited for steam making purposes (other conditions connected with the general arrangements of the plant tending to prevent the water being properly treated so that the scale forming qualities in it may be eliminated). Then, again, the conditions may be such that the water has in it an immense amount of sand. The architect may cause the well to be bored in such a place that when the building is completed it, (the well) is found to be perhaps underneath where a column or something else is supposed to go. This may seem funny, but it is a hard cold fact nevertheless and conditions of this sort have recently come under the writer's notice much to his sorrow. Again, the well may have to be of such a depth, in order to get down to where the water is, that the job of keeping a deep well pump in repair, is an item of the running expenses which has to be taken into very serious consideration. This is easily understood when we remember the expense of doing the actual repair work—pulling up of rods and bucket and putting them down again, cost of extra help and money paid out to the water company, while the pumps are shut down. Then, again, the amount of water the well is able to supply, is absolutely an unknown quantity to anyone. The well borer knows nothing about it, neither do the owners nor lessees of the property. They may, and probably do know about how much water they may need in their business, but as to whether they are going to get it out of the well or not—no matter what mechanical means may be employed—is a problem which many of them would give a good deal to solve beforehand.

A well may be bored, the plant put in operation and everything may go on swimmingly—until somebody bores a well a little higher up or a little lower down and then the bottom falls out with a marked degree of suddenness.

But now let us assume that we have a well, and that indications are such that we may have enough water for all purposes, which shall we use, a pump or an air lift to get the water to the surface? There are few engineers who have not had experience with deep well pumps and most of them had had their share of trouble with them. Some more, others less, as the case may be, and many of them heartily wish that they had no well or that the water was close enough to the surface to make the use of an ordinary surface pump possible. This latter condition seldom obtains, so they must get along as they are. Now comes the consideration of the "air lift" as a means out of the difficulty and the question naturally arises—what advantages has it, if any, over the pump. We are able to say in regard to the pump; that given a certain size of cylinder, a certain length of stroke, and a certain number of strokes per minute we shall get a certain number of gallons of water out of the well in a given time. We cannot, however, say this of the air lift; that is, we cannot say it with anything like certainty. It would appear therefore, that at the start it were better to use something that we are absolutely sure of than something about which we have our doubts. This seems reasonable, but let us look a little further. Suppose we install a pump, which is either found to be too large for the capacity of the well so that the water won't flow to it, and we cannot run it slow enough to accommodate these conditions without its stopping on one end or the other of its stroke, thereby becoming an unreliable nuisance; or we install a pump which is found later on, to be too small to supply the plant; we must in both cases take them out at great expense and install others. With an air lift, the conditions are very much changed and vastly in favor of the air lift, because the air lift, itself only consists of several lengths of galvanized pipe, which can, in most cases, be hauled up, out of the well with very little labor and only a rope tackle, and may be used on some other job and is therefor not lost or wasted.

The air lift, having absolutely no moving parts is at no time subject to any wear, is not affected by any amount of sand, lasts almost indefinitely, requires no attention and will clean out a well faster and better than any other known device. It can be made to work automatically, whether the air compressor be driven electrically or by steam. The only moving part connected with the air lift is the air compressor, which may be placed in any convenient location in the engine room and can be got at and receive the same care and attention as an ordinary pump or engine. We have now scored a point in favor of the air lift.

It has been said before, that we cannot say for a certainty just how much water an air lift will deliver, this is true, but it can be so easily changed that it seems to the writer to be not very much of a drawback.

The action of the air lift is peculiar and totally different from that of a steam pump. It will deliver water to a height with an air pressure under which an ordinary pump (supposing it to be driven with air) would not move. The writer saw one in operation a short time ago which was delivering water, and all the water that the plant required to a height of 460 feet with only 45 pounds of air pressure. This may sound funny, and may be doubted by many, but those who doubt this statement do not understand the action of the air lift. The writer is indebted to the Westinghouse Air Brake Company for the following explanation of this seeming impossible performance. This company has recently completed a series of nearly two thousand tests to obtain data concerning water delivered, air consumed, and the best possible proportion and arrangement of piping and apparatus. The principles involved in the operation of the air lift are extremely simple. Generally speaking, enough air is added to the column of water in the discharge pipe to make the weight of the column of combined water and air between the air inlet and water discharge openings less than the weight of the column of water in the well outside of the discharge pipe; the resultant difference of pressure causes the water to flow from the outside to the inside by force of gravity. Before pumping begins the water level, and consequently the pressure per square inch at the air inlet are the same, both inside and outside of the discharge pipe. As compressed air enters the discharge pipe at a pressure slightly above the hydrostatic head, the column of water above is forced upward. The space left between the rising column and the water in the discharge pipe below the air inlet, is filled by air at the same pressure until the top of the water column reaches the discharge opening. The moment that a portion of the rising water is discharged the weight of the column is thereby reduced and the air beneath it will correspondingly expand, thus reducing the pressure on the water in the discharge pipe below the inlet. The weight of the water in the well outside of the discharge pipe forces the water upward into the pipe stopping the inflow of air. The pressure in the air supply pipe is quickly reinstated through its connection with the supply, and it again forces an entrance into the discharge pipe until its pressure is again slightly reduced by a further discharge from the well and the water again stops its entrance.

This operation is repeated until the whole discharge pipe above the air inlet is filled with alternate bodies of air and water, the combined weight of which is enough less than the weight of the water in the well to maintain a constant flow of water into the discharge pipe from the well. As each body

of air rises the total weight above, it grows less, so that it continues to expand until when it reaches the discharge it issues at atmospheric pressure. In this way a continuous flow from the well is maintained as long as a sufficient quantity of air is supplied and the capacity of the well is not overtaxed. In a problem of this character, the known quantities are usually the total depth of the well, the distance from the surface of the ground to the water level, the height to which the water is to be raised, the quantity of water required, the size of well and the nature and amount of power available for compressing the air. It is also quite essential to know whether the water level remains constant, and if not, what the drop is during the pumping operation. This latter factor is an important one for the reason that if the water in the well falls below a certain point the proper relations between the air lift and the water will not be maintained and the efficiency will be lost, in other words the position of lift must be based on the lowest water level. It must be remembered that the air lift proper consists of nothing but a pipe put down into the well to a certain depth, that part of the pipe below the water level being known as the "submergence," and that part of the pipe above the water level being known as the "lift." The submergence should if possible be two-thirds of the lift to get the best results, and if these conditions are not very nearly maintained the air will break through and go the wrong way, i. e., will back up into the well owing to there being an insufficient water seal.

Strange as it may seem though, even this condition has some advantages in isolated cases. To illustrate: The writer has seen a recent installation of an air lift which is working successfullly under very adverse conditions. The well in this case is only 60 feet deep and the water in it when everything is at rest is only 36 feet deep. It was required to lift this water only about 6 feet from the top of the well into a cistern. This operation had been performed in a very unsatisfactory way by an ordinary deep well pump. So far as capacity went, the well had not, and this pump could not be run slowly enough to keep it in water, consequently it was pumping air most of the time, which was both useless and expensive.

As the plant had, among other things, a 9½ Westinghouse air compressor, an air lift was decided upon, and accordingly a 1-inch pipe was run down to within 12 inches of the bottom of the well and ½-inch air pipe run down along side of it and connected to it with a Tee about 2 feet from the bottom. The discharge of the compressor was connected to an air tank and the apparatus started up. For a few minutes everything went pretty nicely, and then more air came than water. Upon lowering a light down into the well, it was found that the water had receded some 6 or 7 feet and that bubbles of air were coming to the surface and breaking. It was then suggested that the air tank be cut out and the discharge pipe of the compressor be connected directly to the air lift; this was done, the compressor slowed down to 20 strokes a minute, and it was found that while a little air still broke through the water in the well, yet for every stroke of the compressor a solid volume of water went into the cistern, but the water in the well remained at the same level. Now this showed that air lift had become automatic, but slightly inefficient, which taking everything into consideration, was, in this case a great improvement over the performance of the steam pump which under the circumstances had no efficiency at any stage. It must be remembered that there are conditions where an air lift cannot be used to advantage at all, but the writer believes them to be few. And there is no doubt that a little thought and experiment on the part of the engineer will result in making his life easier and his work lighter when the problem confronts him of getting water out of the ground with the least trouble.

P. LANGFORD.

CIVIL SERVICE EXAMINATIONS.

The United States Civil Service Commission announces an examination on August 25-26, 1909, to fill a vacancy in the position of assistant inspector of electric light plants in the office of the Secretary of the treasury, at $1,800 per annum, and vacancies requiring similar qualifications as they may occur in the Treasury Department, unless it shall be decided in the interests of the service to fill the vacancy by reinstatement, transfer, or promotion. The duties of the position require expert knowledge in the design and testing of electric light plants, including boilers, steam engines, turbines, and electric generators and motors, the installation and design of electric wiring systems and knowledge of illumination with respect to equipping buildings with modern lighting fixtures, and also experience in the selection of fuel for power plants. Applicants who fail to indicate in their applications that they have had at least five years' practical experience in mechanical or electrical engineering will not be admitted to this examination. Graduation in mechanical or electrical engineering will be considered as equivalent to not less than two years of this period.

The United States Civil Service Commission announces an examination on August 24-25, 1909, to fill a vacancy in the position of assistant (male), at $1,000 per annum, in the Naval Observatory, Navy Department, Washington, D. C. The examination for this position is considerably less difficult than that for assistant, class 2, which will be held on August 26-27, 1909.

NATIONAL ELECTRICAL TRADES ASSOCIATION TO MEET IN SAN FRANCISCO.

On his recent trip to the East, C. C. Hillis of San Francisco, delegate to the recent annual meeting of the National Electrical Trades Association, succeeded in bringing about action which will result in the holding of the next annual meeting, which will be in June, 1910, at San Francisco.

During the intervening time the executive committee of this association on the Pacific Coast will complete arrangements for a program of combined business and entertainment which will make this visit of the Eastern credit men a notable event in their business experience. The plans already discussed contemplate business sessions at Mt. Tamalpais, a banquet in San Francisco, a trip to the Big Trees near Santa Cruz, and last but not least, a golf tournament at the Claremont Country Club, Oakland.

The Credit Association has not yet taken up golf as an association matter, but the success which the Jobbers' Association has met with in introducing the game into their business sessions has convinced them that the average credit man can be made a good golf player.

The executive committee of the association contemplate an artistic poster to announce the event which will be freely distributed among the electrical people of the East and an effort will be made to bring Eastern electrical people generally to this section at about the same time.

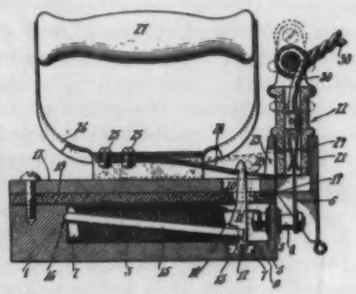
EXTENSION OF THE SONOMA VALLEY SYSTEM.

The Bay Counties Power Company has just executed a contract for twenty years with C. T. Ryland of the Sonoma Valley Company for the district of Novato, Cal.; for the extension of the present lighting system in that district to be operated as a separate company and to be known as the Novato Light Company. This contract will necessitate the doubling of the present transformer capacity of the Sonoma Valley Company.

The present contract with the Sonoma Valley Company has been extended 16 years.

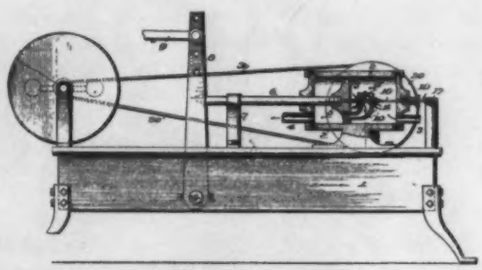
PATENTS

928,402. Controlling Means for Electric Heaters. Earl H. Richardson, Ontario, Franklin Booth, Alhambra, and Wynn Meredith, San Francisco, Cal., assignors to Pacific Electric Heating Company, Ontario, Cal. In an electric



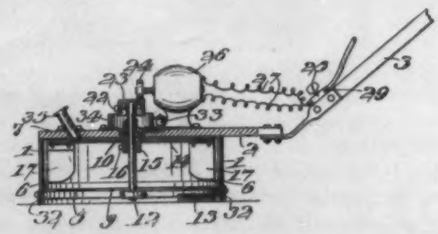
heater, terminals therefor, a socket adjacent the terminals, a detachable connection plug slidable in the socket into or out of connection with the terminals, and a thermostatic device for sliding the plug a limited distance in the socket to move it out of connection with the terminals but not out of the socket.

928,854. Hydraulic Governor. Arthur Dickerson, American Fork, Utah. The combination, with a governor responsive to changes in the speed of the motor, of a cylinder having a water inlet and discharge, a piston arranged slidably therein



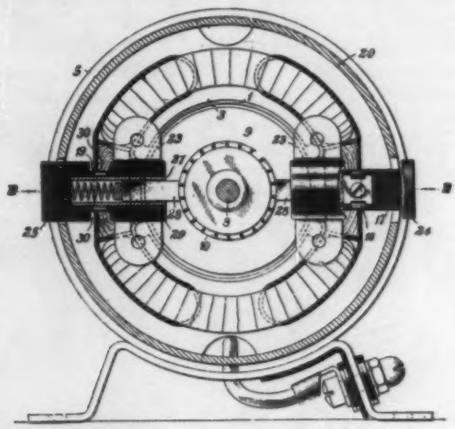
and operatively connected with a gate for controlling the flow of water, the piston being provided with a tube having an opening for the flow of water through it, a valve adapted to close such opening, and a lever attachment which operatively connects the valve with the governor.

928,456. Sweeping-Machine. Joseph O. Johnson, Visalia, Cal. In a sweeping machine, an outer supporting casing, a fan casing arranged in said outer casing, an operating shaft, a series of fan blades operatively mounted on said shaft within said fan casing, radially projecting curved brushes



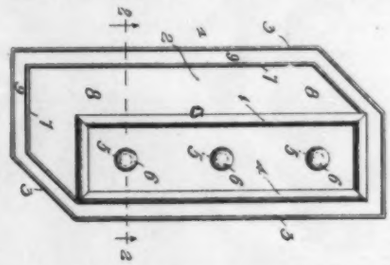
mounted on the outer end of said shaft, a discharge tube connected to said fan casing, and a fabric dust receptacle connected to said discharge tube, said receptacle serving to separate or filter the dust from the air passing through the same.

928,771. Dynamo-Electric Machine. Fred R. Kunkel, Edgewood Park, Pa., assignor by mesne assignments, to Westinghouse Electric & Manufacturing Company, East Pittsburg, Pa., In a dynamo-leceric machine, the combination with stationary



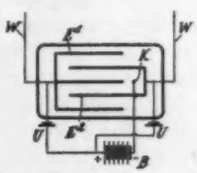
and rotable members, of a sheet metal casing therefor comprising two parts one of which contains and supports the said stationary member and each of which is provided with a substantially hemispherical, outwardly projecting end socket, and substantially spherical bearing sleeves adjustably secured in the said sockets.

928,916. Illuminated Shaded Letter. Charles H. Hulse, North Yakima, Wash. An illuminated shaded letter comprising a back or base plate, a flange arranged around the outer edge



of said base plate to form a trough, a raised strip on said base plate to form the outline of the letter, a flange arranged to form the outline of the shading, and means to secure a series of incandescent lamps within the outline of the letter.

926,128. Electrolyte-Condenser. Ignacy Moscicki, Gambach, near Fribourg, Switzerland. In an electrolyte condenser, the combination, with aluminum electrodes immersed in an electrolyte, and an alternating current working circuit in which said electrodes are included, of a transformer having its pri-

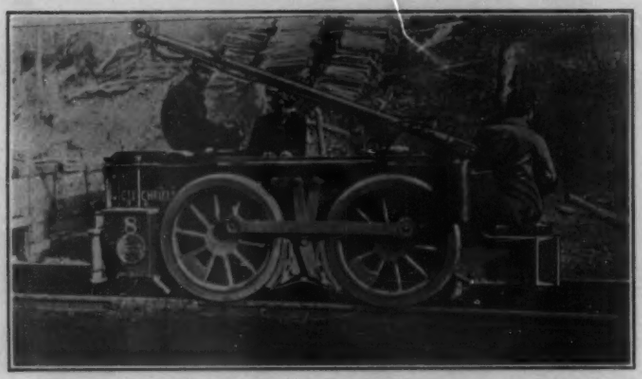


mary included in the working circuit, the electrodes being connected as anodes to the secondary of said transformers, an auxiliary electrode in circuit with the aluminum electrodes and connected to the transformer secondary as a cathode, and means for rectifying the current supplied from the secondary to the aluminum electrodes.

INDUSTRIAL

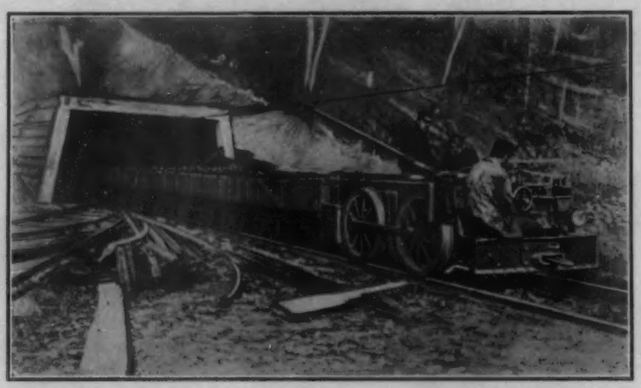
THE ROAN TYPE GATHERING LOCOMOTIVE.

An improved electric mining locomotive of the "gathering" type, in which a single powerful motor performs the functions of both propulsion and operation of the gathering reel, has been brought out by the Westinghouse Electric & Manufacturing Company and the Baldwin Locomotive Works, under the patents of an invention of Mr. J. M. Roan. Mr. Roan, who is general manager of the Clinchfield Coal Corporation, is a practical mine operator, and on this account the gathering locomotive of his invention may be relied upon to meet exactly the requirements demanded by the practical mining man.



Roan Type Westinghouse Gathering Locomotive.

In the Roan gathering locomotive the single motor used to drive the wheels is arranged to be detached and connected to the wire-rope gathering reel. The wheels or the reel may thus be operated either independently or simultaneously, winding up the rope while the locomotive is in motion.



Roan Type Westinghouse Gathering Locomotive in Operation.

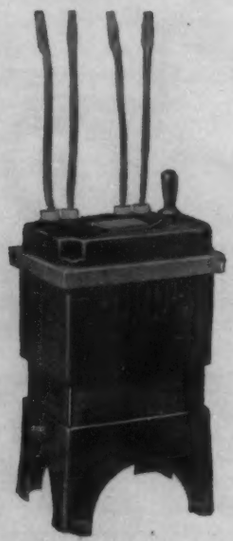
The arrangement described secures advantages of flexibility, compactness and reduced amount and cost of electrical apparatus, attained in no other type. The provision of one powerful motor to perform the duties of both gathering and driving motors, cuts in half motor and controller expense, at the same time making the total power of the traction motor available for the gathering reel.

When loaded cars are to be hauled from the working face to the butt heading, on which the locomotive stands, the rope is paid out and attached to the cars. The main driving motor is then unclutched from the axle and connected to the reel which winds up the rope, drawing the car toward the locomotive which stands, with its brakes set, on the heading track. The provision for propelling the locomotive at the same time the reel is in operation, enables the cars to be swung on to the heading without sawing the rope on the rib at the room neck. In service, many applications have suggested themselves for the combined tractive and hauling-in actions secured from the motor. Derailed cars may be easily replaced on the track, timbers and rails recovered from under falls of rock, rails loaded on cars, and in fact the reel can be used for any kind of general hoisting work.

The motor transmits its power, through a single spur gear, directly to one axle. The two axles are connected together by side-rods spaced 90 degrees apart, securing increased tractive effort beyond that of any single-motor or two-motor locomotive. As shown, the wheel is extremely short, although the wheels are of full size, and the maximum amount of service is secured by the spring suspension of the frame and motor. The locomotive frame is made up of steel angles and plates, giving maximum strength for a given weight.

THE COMPENSARC.

The need of some kind of a device for controlling arc lamps on moving picture machines is obvious when it is known that moving picture machine arc lamps operate at approximately 35 volts at the arc, while the voltage obtainable from practically all commercial lighting circuits is either 110 volts or 220 volts. Some electrical device must of necessity, therefore, be used between the line and the lamp to take care of the difference in voltage. Formerly iron wire or



The Compensarc.

grid resistance rheostats were used. Their use, however, resulted in a waste of all that energy supplied from the line over and above that actually required by the lamp. Progressive managers are now using compensarcs instead of rheostats and thus save all that amount originally wasted.

The compensarc, therefore, must of necessity be invaluable to all moving picture theaters operating their arc lamps from alternating current circuits. The compensarc cannot be used on direct current circuits. It is in reality a special type of adjustable, auto-transformer.

The great saving in power resulting from the use of the compensarc, with the superior quality of light in color, intensity and stability, make it a prime favorite with all moving picture men who have tried it.

The compensarc is known as Type A, Form 4, and is rated at 2 k. w. for 110 volts of 2½ k. w. for 220 volts, and wound for either 60 cycles or 133 cycles, as may be desired.

The general appearance of the compensarc is clearly shown in the illustration. The core is made of the highest grade sheet steel laminations, similar to standard transformer construction. The outer surface of the core is fully exposed to the air. The coils are mounted within the core and are completely protected and thoroughly insulated. Core and coils are given vacuum treatment, making them moisture and water proof.

The assembled core and coils are supported by a cast iron base having four legs which hold the compensarc at a convenient height from the floor. The case is also of cast iron and rests on the top of the core. It is liberally ventilated and encloses the ends of the coils and protects the connections on the inside. A slate top supports the switch blade and clips. The slate top, case and base are securely held together by four long, heavy bolts, one passing through each corner of the slate top, case and base outside the core.

A horizontal, three-step, continuous circuit switch is mounted on the slate top, providing three adjustments for intensity of light. Each adjustment is so designed that it maintains approximately the same voltage at the arc while passing from one step to the next, without at any time opening the circuit which would consequently break the arc and produce flickering.

There is no waiting for the arc to settle and become steady before the intensity of the light can be determined. The compensarc increases or decreases the intensity of light without a flicker.

A cast iron cover over the slate top completely encloses the switch blade and contacts, making it impossible for accidental short circuits to occur, and also removes all danger to the operator. The terminals to the line and lamp are brought out through porcelain insulators in the cover. The lamp terminals are plainly designated by the word lamp cast on the cover where the terminals come through. With a little care the compensarc can be installed by any operator.

As to appearance, it is decidedly neat and symmetrical, plain, but not homely, a desirable addition to any operating room. It is extremely simple to operate—one hand on the switch handle controls everything.

The compensarc is approved by the National Board of Fire Underwriters. There is positively no fire risk, as there is no noticeable rise in temperature even after several pictures have been run through the machine.

Quality of light is so important in moving picture shows that it really makes or mars their success. The compensarc provides a clear, white, steady light.

The compensarc is very substantially made and maintains its usefulness indefinitely. It cannot be short-circuited. Even though the switch blade is at an intermediate point and thus bridging two adjacent contacts, it will not burn out. The adjustments possible with the compensarc are very essential to successful moving picture work and the fact that the compensarc provides these adjustments without breaking the circuit and putting out the light makes it all the more desirable.

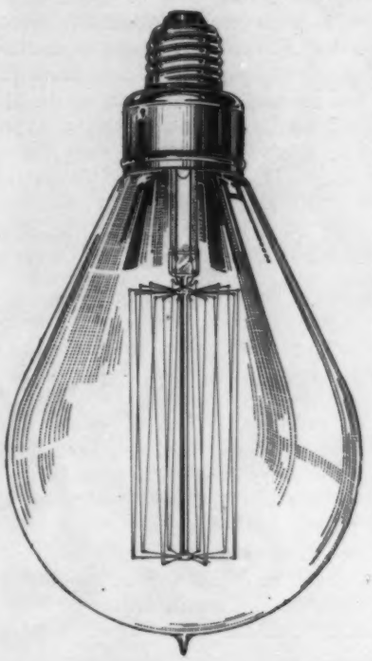
The compensarc saves 66 2/3% on light bills for moving picture arc lamps.

K. & E. LOG LOG DUPLEX SLIDE RULES.

Keuffel & Esser Co. of New York have issued a circular describing and illustrating problems solved by the K. & E. Log Log Duplex Slide Rules, which is especially devised for the solution of examples and formulas involving fractional powers and roots, as well as natural or hyperbolic logarithms. In addition to the Log Log Scale, all the ordinary logarithmic and trigonometrical scales are on the Log Log Duplex Slide Rules, and these rules are therefore capable of performing a practically unlimited range of problems. The Log Log Scale, as its name indicates, represents the Logarithms of the Logarithms of a series of natural numbers, so that while the C D scales give the logarithmic location of the natural numbers read on them, the Log Log Scale gives the corresponding Log Log location. The scale is graduated in three sections, one below the other. Scale LL1 is graduated from $e^{\frac{1}{1000}}$ to $e^{\frac{1}{10}}$; LL2 is graduated from $e^{\frac{1}{10}}$ to e; LL3 from e to e^{10}, thus giving the limits 1.01 and 22,000, quite high and low enough for practical purposes, e being the base of the Hyperbolic or Natural Logarithms.

Problems in hydraulics and electrical engineering involving fractional powers, hyperbolic logarithms and trigometric functions are readily solved by its aid. It is also useful in checking compound interest calculations to the fourth significant figure.

NEW 200-250 VOLT TUNGSTEN LAMPS.



The advantages and economy of the Tungsten Incandescent over the carbon filament lamp have been practically denied to most circuits operating at 200-250 volts, because the regular multiple Tungsten lamps were designed for the standard voltage of 100-125. On these larger voltage circuits—for example: 220-volts—in order to use Tungsten lamps at all it was necessary to operate two 110 volt lamps in series. Most users of the higher voltages preferred to wait for the advent of the Tungsten adapted to their voltage.

In answer to this considerable demand, the General Electric Company has extended its production of Tungsten lamps into voltages from 200-250. This gives to the users of higher voltages the opportunity for the adoption of the economical high-efficiency lamps for multiple service. The regular G. E. 200-260 volt carbon filament lamps ranged in efficiency from 3.8 w. p. c. to 3.1 w. p. c. The new Tungsten has the usual Tungsten efficiency of 1¼ w. p. c.

They possess all the excellent qualities of the regular G. E. 100-125 volt Tungsten lamps, including the same form of specially anchored filaments which make the G. E. 100-125 volt lamps so successful.

Thorough and ample tests of the new 200-250 volt Tungstens show exceptionally good results, the average life and performance of these lamps being fully up to that of the standard multiple lamps. They are a decided triumph for lamp manufacture and will prove very popular with all who require 200-250 volt lamps.

The lamps are supplied in the following sizes and prices:

	Plain.	Frosted.
45 watt	$1.75	$1.80
70 watt	2.25	2.35
110 watt	2.50	2.65
180 watt	3.75	3.95

These prices are subject to the same discounts as given on the regular 100-volt Tungsten lamps and the same general terms of delivery.

NEWS NOTES

FINANCIAL.

MONROVIA, CAL.—A call for bids for $16,500 water department bonds voted recently has been issued by the City Trustees.

SANTA BARBARA, CAL.—James H. Adams & Co., of Los Angeles, will take up $40,000 waterworks tunnel extension bonds at a premium of $2043.

PASADENA, CAL.—The Lake Vineyard Land & Water Company has decided on an assessment of $5 for each share of its stock to obtain a betterment fund of $50,000 with which to extend its system. The improvements include a reservoir and a new 16-inch main.

OAKLAND, CAL.—The water rate case of the city of Oakland against the Contra Costa Water Company, which has been in the courts for the last eight years, and is similar in many of its features to the Spring Valley rate cases in San Francisco, has been brought to the front again by the filing of a petition in the Supreme Court for a rehearing. The petition, which was filed by Garret McEnerney, asks for a rehearing of the points decided by the Supreme Court on July 6th. In that decision the higher court held that the Superior Court was in error when it decided that the rate made by the City Council was illegal.

COLUSA, CAL.—The Town Trustees have passed a resolution declaring the town in need of waterworks and have instructed the city attorney to draw up an ordinance calling a bond election. According to the plans and specifications for the new waterworks the town will have a tank to hold 100,000 gallons of water to be located ninety feet above the base. A high pressure pump will be installed to pump directly into the mains when water is needed for fire purposes. Ten and twelve inch mains will run down Sixth street, with six and four inch pipes leading down each alley way. A fire plug will be located at every other alley way, and alternating at every other street, so that it will be possible to secure three streams of water on any fire in town.

INCORPORATIONS.

OAKLAND, CAL.—Celia Oil Company, capital stock $20,000, by A. L. Leal, F. D. Burr and A. J. Moore.

SANTA ANA, CAL.—Pleasant Canyon Water Company, capital stock, $50, by Laura Hill, E. F. and Ada Burson, of Los Angeles.

SANTA ANA, CAL.—Modjeska Mineral Springs Land and Water Company, capital stock $25,000, by same as above.

LOS ANGELES, CAL.—Pathfinder Oil Company, capital stock $1,000,000, by Julius Fried, A. Hodgkinson, G. W. Henderson, H. C. Shippee, R. C. Cabe and others.

LOS ANGELES, CAL.—Piedmont Gas Company, capital stock $200,000, subscribed $50, by C. S. S. Forney, J. H. Badger, F. M. Guyer, G. L. Pro and J. H. Hyde.

SAN FRANCISCO, CAL.—Solano-Yolo Land and Water Company, capital stock $500,000, shares $100 each, subscribed $500, by C. M. Wooster, H. D. Loveland, H. H. Sanborn, F. H. Gould and S. R. Chappel.

SAN FRANCISCO, CAL.—Princess Oil Company, capital stock $1,000,000, shares $1 each, subscribed $9, by J. A. Boyd, D. Driscoll, T. A. Duffy, R. P. Kavanaugh, Philip Lawler, A. J. Rankin, C. L. Smith, E. B. Thomas and J. E. White.

TRANSPORTATION.

UPLAND, CAL.—Garney & Pitzer of Los Angeles have been awarded the contract for grading for the proposed electric line between this city and North Pomona.

BERKELEY, CAL.—The announcement is made of the abandonment by the Oakland Traction Company of the proposed extension of its Grove-street line westerly through Ocean View to connect with the San Pablo avenue line.

TACOMA, WASH.—A franchise has been secured by the Stone & Webster interest of Tacoma for the extension of the Stillacoom line through the town of Salters Point, and the surveys have been made. Construction work will begin at once.

REDLANDS, CAL.—Redlands capitalists have subscribed $100,000 to the Mile High electric railway project, this amount having been allotted to this city by President J. M. Neeland and M. A. Newmark, of Los Angeles, principal builders of the road. It is expected that work will be started soon.

TACOMA, WASH.—The Puget Sound Electric Railway has purchased the Pacific Traction lines in this city and the latter pass into the hands of the Stone & Webster interests. The price runs into several millions and the transfer will take place August 1. The present lines, it is understood, will be continued on to Olympia and ultimately to Grays Harbor.

SAN FRANCISCO, CAL.—Extensive improvements are to be made in the Presidio and Ferries Electric Railway, the directors of the company having decided to add to the equipment of the road and to make betterments in the roadbed. A certificate of the creation of a bonded indebtedness of $300,000 has been filed with the county clerk. It sets forth that the money is available under those bonds for the improvement of the line. A former bonded indebtedness of the company has been paid off out of the profits, and now more capital will be invested to give the northern part of the city through which the line runs a much improved car service.

TRANSMISSION.

PACHUCA, MEX.—The Compania Electria y Irrigadora of the State of Hidalgo is preparing to install a power plant at Tetepango costing $2,000,000, to be finished in 12 months.

EUGENE, ORE.—Sealed proposals are being received at the office of the city recorder for supplying cross arms, brace belts, washers, pins, insulators, guy wire, etc., for the construction of a fifteen-mile transmission line.

HAGERMAN, IDAHO.—H. A. Stroud and associates have purchased rights on the Snake river at the Upper Salmon Falls where they contemplate the generation of 75,000 horsepower and have in mind the construction of an electrical railway through Hagerman valley.

TONOPAH, NEV.—P. J. Conway has sold his ranch and power holdings in Sweetwater, Nev., to Dr. Pollars and Geo. P. Costigan of Denver. These gentlemen will soon begin construction of a large power plant on the river for the purpose of supplying power to Masonic, Luckboy, Hawthorne, Aurora, etc.

REDDING, CAL.—In the injunction suit of D. G. Hunt and a dozen other farmers against the Northern Light and Power Company and its successor, the Sacramento Valley Power Company, Judge Barber has granted a temporary in-

junction restraining the power company from taking water from Old Cow Creek and conveying it to South Cow Creek.

MERIDIAN, CAL.—It is stated on good authority that the electric power line from Marysville to Meridian through Sutter county will be completed by January 1st. After the main line is finished the power will be distributed through District 70 for irrigation and other purposes. Mr. Sedgewrick, of the Pacific Gas and Electric Company of San Francisco has concluded arrangements for the work. The power line will take the route of the proposed Northern Electric Railroad through Sutter county to this point.

DORRIS, CAL.—Butte Valley is to have electric power in the near future for electric pumps, electric lights, etc. The project is being floated by Moore Bros. of Klamath Falls, and was presented to the citizens of Dorris by Frank Rose. The proposal is to put in a $75,000 plant on the Klamath River, and stretch lines throughout Butte Valley, lighting the towns of Dorris, Macdoel and Mt. Hebron, and furnishing whatever power may be called for, though the main object will be the furnishing of electric power to operate pumping plants throughout the valley.

SAN FRANCISCO, CAL.—The following are given as the leading points settled in the arrangements between the Truckee River General Electric Company and the federal government. The Truckee River General Electric Company relinquishes control of the Truckee river outlet to Lake Tahoe to the government; the federal government in exchange grants the Truckee River General Electric Company perpetual rights at any location in the Lake Tahoe and Truckee river watersheds; the government agrees to pay one-half the cost of building a new Truckee dam and the full cost of operating the same for irrigation purposes.

TELEPHONE AND TELEGRAPH.

SEATTLE, WASH.—The City Council has decided that all telegraph wires must go underground.

SAN LUIS OBISPO, CAL.—Sealed bids will be received by the Board of Trustees up to August 23d for a 50-year franchise to lay and operate lines to carry petroleum, oil and its by-products in this city; also a franchise for 50 years to construct and operate telephone and telegraph lines to be used in connection with said pipe lines.

SEATTLE, WASH.—Edwin V. Corby, architectural engineer for the Pacific Telephone & Telegraph Company, has gone to San Francisco, carrying with him data for construction of three new buildings as part of expenditure totaling $1,003,075 to be made in Seattle this year. Work is to commence on the new buildings August 1st.

ALAMEDA, CAL.—In addition to the $120,000 already secured for improvement of the Alameda telephone system, H. Brownlee, manager of the local branch, has asked for an additional $80,000 with which to make further improvements, and has received assurance that the amount will be granted. The Western Electric Company has put a force of 22 men at work installing new lines, changing the batteries from the local to the common system and putting in improved relays.

SAN FRANCISCO, CAL.—Architects Coxhead & Coxhead are completing the working drawings for the Market-street building, which the Home Telephone Company will erect for its long distance service. The building will also contain offices for the company. It will be class-A, with steel frame, stone front and brick walls. These architects also have plans about ready for the Richmond District sub-station, to cost about $20,000. The building will be of brick and Colusa sandstone, and will have considerable tile, hardwood and ornamental iron.

ILLUMINATION.

WASHTUCNA, WASH.—W. A. Gildersleeve will probably construct an electric light plant near here to cost between $5000 and $6000.

NOGALES, ARIZ.—Ground has been broken for the new gas works, which will cost about $50,000. Capital has been guaranteed by Cleveland people.

ESCONDIDO, CAL.—An application for an electric light and power franchise has been filed with the Council by Seth Hartley of Colton, and the sale of the franchise is set for September 14th.

ST. MARIES, IDA.—G. H. Jay has secured from the village trustees a franchise for lighting the towns. Mr. Jay proposes to install a water power plant which will cost about $35,000 and will develop 1000 horsepower.

SEATTLE, WASH.—Fire occurred in the central station of the electric company on Seventh avenue and Yesler way, July 22d, causing a loss of $300 due to ignition by electricity of lubricating oil on one of the transformers.

LOS ANGELES, CAL.—The Board of Supervisors has passed a resolution calling for an election in East Hollywood and Florence for the establishment of a lighting district in these towns. The election will be held August 10th.

KLAMATH FALLS, ORE.—Moore Brothers of this city and E. P. McCormack of Salem are making preparations to erect a large light plant about twenty miles southwest of this city. It is estimated that 2500 horsepower can be developed.

SAN BERNARDINO, CAL.—According to the statement of O. C. Conley of Los Angeles, representative of the merged San Bernardino Valley Gas Company, Z. T. Bell, present manager of the Home system, will be appointed general superintendent of the new company. Work will begin immediately on combining the systems.

TACOMA, WASH.—Frank C. Kelsey, engineer in charge of the construction of the new $2,000,000 municipal power plant, has enlarged the original plans so that 30,000 horsepower will be developed from the Nisqually instead of the 20,000 as at first proposed. This 30,000 horsepower will be brought in over the city transmission lines to a station to be erected at South C and Twenty-fifth streets. The concrete dam will be 45 feet in height and 45 feet at the base.

WATERWORKS.

ESCONDIDO, CAL.—The Mutual Water Company is going to expend $12,000 in improving its plant.

ODESSA, WASH.—The Council has granted the Washington Water Power Company a 50-year franchise.

LEWISTON, IDAHO.—Water Superintendent Wagner has submitted a communication to the Council asking for additional water pipes for his department.

CRESCENT CITY, CAL.—Sealed proposals are being received at the office of the City Clerk for furnishing this city 3000 feet of 3-inch black pipe delivered here.

GRIDLEY, CAL.—Bids are being received by Clerk H. T. Batchelder of the Board of Supervisors for the erection of a water works system for sprinkling purposes here.

TACOMA, WASH.—Sealed proposals are being received by the City Comptroller, for a lot of 4-inch cast iron pipe. The city will consider bids by the foot and by the pound.

WINTHROP, WASH.—Fred Ventzke of the Winthrop Land Company, accompanied by Frank McKean, the hydraulic engineer, and William Cunningham, a civil engineer of Philadelphia, were visiting a proposed power site on the North Fork recently. It is said the power plant is now assured.

KALISPELL, MONT.—Engineer Gilbert of Chicago is at Big Fork preparing to survey a new canal for the Northern Idaho & Montana Power Company. The flume will be about a mile long.

UPLAND, CAL.—Steps have been taken by the San Antonio Water Company for a new pipe line to serve the reservoir near Twelfth street, from which the local domestic supply is drawn.

MOUNT VERNON, WASH.—The county commissioners granted a franchise to Sydney Smith to lay water mains on the public roads for supplying the cities of Mount Vernon and Burlington with water.

GOODING, IDAHO.—Rafo & Spear have completed a well 200 feet deep on the Wentworth Addition to Gooding and have erected a large wind motor. A water system will be put in on this addition at once.

TACOMA, WASH.—The Council has adopted resolutions providing for the construction of water mains in Section 30, Township 20 North, Range 3 East; same being in Local Improvement District No. 542.

SAN BERNARDINO, CAL.—To replace the old 6-inch water main on Third street west of G the Board of Water Commissioners has placed an order for two cars of new 8-inch cast iron water mains.

EUGENE, ORE.—The contract with the Washington Pipe & Foundry Company has been rescinded and a contract let to the Portland Wood Pipe Company for 10-inch wood stave pipe at 47½ cents per lineal foot.

CARSON CITY, NEV.—Sealed proposals will be received by the Capitol Commissioners until August 30th for furnishing the State f. o. b. Carson City, 5700 linear feet of 8-inch Converse lock joint pipe and a large quantity of fittings.

MADERA, CAL.—The City Trustees have decided to recall the publication of the notice to contractors for bids on the water system until after the decision of the injunction suit begun by the Madera waterworks against the City of Madera.

SEATTLE, WASH.—Sealed bids are being received by C. D. Bagley, secretary of the Board of Public Works, for laying water mains in Rainier avenue, with all necessary appurtenances according to plans and specifications on file in the office of the Board.

ROSWELL, N. M.—Joseph Carper & Sons are to drill four or more shallow wells at Albuquerque for the water plant at Duke City, an increase in the water supply being needed. Ernest Carper and Harry Hutchinson have gone to Albuquerque to close the contract.

VALLEJO, CAL.—The Board of Public Works has instructed City Engineer Noyes to visit Cordelia and draw up a plan of city water mains at that place. It is the intention of the Board to have about 600 feet of new water main laid at Cordelia and all consumers supplied with meters.

SAN FRANCISCO, CAL.—Sealed bids will be received by the Board of Public Works August 16th, for furnishing and delivering to the city and county of San Francisco, of a quantity of cast steel specials estimated at approximately 2378 tons, for the auxiliary salt water supply system for fire protection.

SEBASTOPOL, CAL.—The Board of Trustees of Sebastopol will receive bids for laying municipal water mains from the northerly terminus on North Main street, to the new Union High School building, which will require about 380 feet of 4-inch pipe, two 4x4x4 tees, two 4-inch plugs, two 4-inch gates, one single fire hydrant, and the necessary lead, oakum, and work necessary to complete the same, up to August 2, 1909.

LAS VEGAS, NEV.—The Las Vegas Land & Water Company has applied to the Board of County Commissioners for a franchise to construct for municipal or other purposes, water pipe lines, water mains, etc., along each and all streets in this town. Application will be heard on August 2d at the office of said Board.

MADERA, CAL.—The Board of Supervisors sitting as a Board of Equalization has raised the assessment of the Madera Water Company from $10,900 to $21,330. This was done on the sworn statement of Manager Wishon which was presented to the City Trustees showing the value of their property here as the basis for fixing water rates.

SEATTLE, WASH.—Sealed proposals will be received by the city up to July 30, 1909, for the improvement of Wilson avenue from Graham street to Holly and others, by laying water mains. Bids will also be received at the same time and place under same conditions for laying mains in Twentieth Avenue Northwest from Canoe Place to West 75th.

MODESTO, CAL.—The Trustees will on Wednesday, August 11th open bids for 16,000 feet of 4-inch diameter standard cast iron water pipe, more or less; also 2000 feet of 6-inch diameter standard cast iron water pipe, more or less; also 100 crosses, more or less, to be of such dimensions and ordered in quantities as the Board may direct. All fittings to be cast with round turns and to be approved by the city engineer. All pipe and fittings to be what is known as standard weight and to be properly dipped and delivered at Modesto, f. o. b.

COALINGA, CAL.—There is another project on foot to provide a water supply for Coalinga. Suit was filed in the Superior Court of San Benito County Thursday by Pierce Evans, the local attorney, A. E. Webb and C. A. Murdoch, all of Coalinga, to condemn existing riparian water rights along the San Benito creek in favor of the plaintiffs and, if they are successful, in their purpose, these gentlemen plan to divert an appropriation of 500 miners inches of the water of this stream over the hills into Coalinga and vicinity.

ALAMEDA, CAL.—The City Council has taken intial steps to supply Alameda with an auxiliary salt-water system for fire-fighting purposes. The Council in committee accepted the offer of the Dow Pumping Engine Company to furnish the city for ten years free the use of the plant at the company's new factory on the north side waterfront. The city will lay a 12-inch main in Oak street, for the entire width of the city from the Dow plant to the municipal electric light plant. The cost of laying this main will be about $10,000, and the system will be extended from year to year until it covers the city.

SAN FRANCISCO, CAL.—The transfer of the North Fork Ditch from the North Fork Ditch Company to the American Canyon Water Company and subsequent mortgaging of the property by the American Canyon Water Company to the First Federal Trust Company of San Francisco for $300,000 was made known last week by filing the respective deed and deed of trust with County Recorder Root at Sacramento. The property held by the new corporation is given as security for the $300,000 loan which is covered by 20-year 6 per cent gold bonds. The American Canyon Water Company and American Irrigation Company are subsidiary companies of the California Corporation, which acquired the ditch property and the Fairoaks Water Distributing system. The final payment of $35,000 to the North Fork Ditch Company by the California corporation was made Friday.